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*Dedicated to
the memory of:
F. BAGLIETTO
G. DE NOTARIS
A. MASSALONGO*

Introduction

In early 1985 the authors planned to organise a lichenological excursion to Sardinia as a part of the excursion programme for the XIV International Botanical Congress (Berlin, July 1987). The island of Sardinia was chosen because of its great phytogeographical interest: It lies in the centre of the western Mediterranean Basin and has a great variety of geological substrates. As most parts of the Mediterranean region, Sardinia is relatively poorly known from a lichenological point of view. In order to organise the excursion, field-trips to Sardinia were carried out in Summer 1985 and in Spring 1986. On these occasions extensive collections were made from several parts of the island; the identifications resulting from this material provided a preliminary list of taxa. Further additions came from colleagues who had already visited the island, from exsiccata in herbaria, from scarce literature records and, above all, from the herbarium Baglietto (MOD), where most of the samples cited by BAGLIETTO (1879) in his first and seminal catalogue of lichens of Sardinia are preserved. The present work includes a critical revision of the lichens known from Sardinia.

The Mediterranean region is among the lichenologically least studied parts of Europe and, as a consequence, the circumscription of many taxa is not yet clear, and the distribution and ecology of many species are badly known. It was obviously impossible for us to solve all these problems; in the short notes appended to each taxon we often either draw attention to the existence of problems, or give some general information on the distribution and ecology of the taxa, with particular regard to Italy, the lichen flora of which is one of the most poorly known in Europe. Many collections at our home institutions still remain unidentified because of taxonomic difficulties, which cannot be solved in a reasonably short time.

The number of taxa at specific and varietal level listed in this book is 901. It is certain that the lichen flora of Sardinia is much richer, and that much more profitable work can be carried out in the lichenological exploration of the island. In spite of its incompleteness, we decided to publish this annotated list in order to provide a modern review of lichenological research in Sardinia, which might act as a reference point for future studies.

We hope that in time this book will become outdated, revealing its shortcomings, not least as a consequence of the International Excursion itself; this would be an indication that it actually fulfilled the role for which it has been published.

The natural environment of Sardinia

Geography

The island of Sardinia lies in the centre of the western Mediterranean sea, between $38^{\circ} 51' 52''$ and $41^{\circ} 15' 42''$ lat. north (Capo Teulada-P.ta Falcone) and between $8^{\circ} 8'$ and $9^{\circ} 5'$ long. east (Capo dell' Argentiera-Capo Comino). Its shape is approximately rectangular, with the longest sides disposed in a north-south direction. The distance between the northern and southern extremities is of ca. 270 Km, the average distance between the eastern and western coasts of ca. 145 Km., with a minimum of 96 Km in the narrowest portion between Oristano and Barisardo.

Sardinia, with a surface area of 24.089 Km² is the second largest island of the Mediterranean sea. Although the maximum elevation is only of 1834 m (P.ta Lamarmora, Gennargentu), the landscape of the island is characterized by very rugged geomorphological features, with a prevalence of mountains. The only extensive plain is the Campidano region, extending from the gulf of Cagliari to the gulf of Oristano in a southeast-northwest direction for approximately 100 Km. This plain separates the mountains of the southwest (M. Linas, 1236 m) from a mountain area extending over the central and eastern parts of the island, whose highest peaks are M. Limbara in the north (1362 m), the Gennargentu Massif in the centre (1834 m) and P.ta Serpeddi in the south (1062 m). In some areas, especially the Barbagia region, the different massifs are separated by narrow, deep gorges, which have made access very difficult in the past. Peculiar geomorphological features are the "Giare" of central-eastern Sardinia,, extended plateaus with steeply declining margins consisting of effusive rocks (mainly basalt), and the "Toneri", conical structures derived from the erosion of a dolomitic limestone cover.

The most important rivers (Tirso, Flumendosa, Flumini Mannu, Coghinas) originate in the high mountains of the province of Nuoro. Many of the smaller rivers dry out more or less completely during summer. There is only one natural lake, Lago di Baratz in the Nurra region, but a great number of artificial lakes are scattered throughout the island. The coastline, including the satellite islands, is 1897 Km long.

The administrative subdivision of Sardinia in four Provinces (Cagliari, Nuoro, Oristano, Sassari) does not always reflect a natural articulation of the island on a geographical or ethnological basis. Of more interest is the traditional subdivision in historical-geographical districts, which often include areas formally belonging to different administrative provinces. The main districts are shown in Fig. 1.



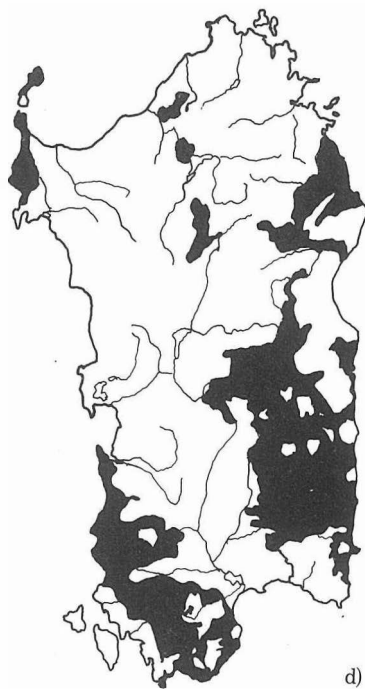
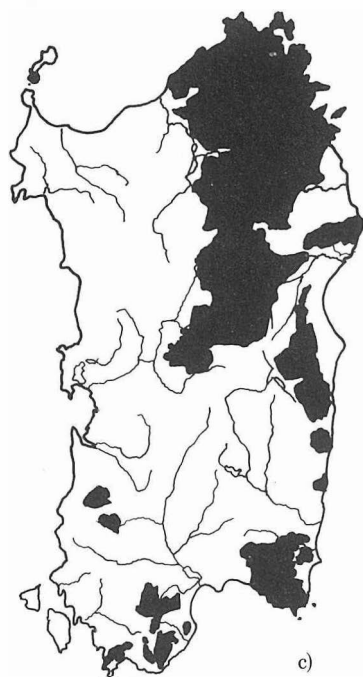
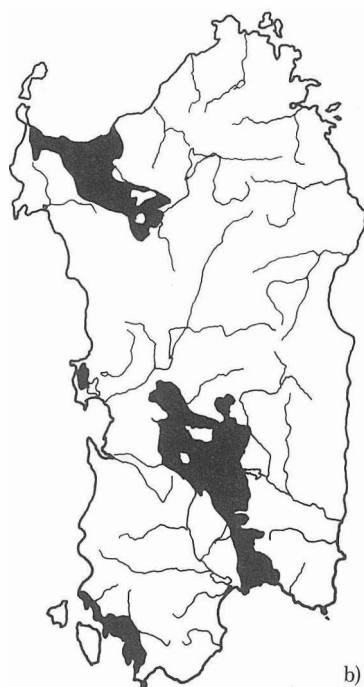
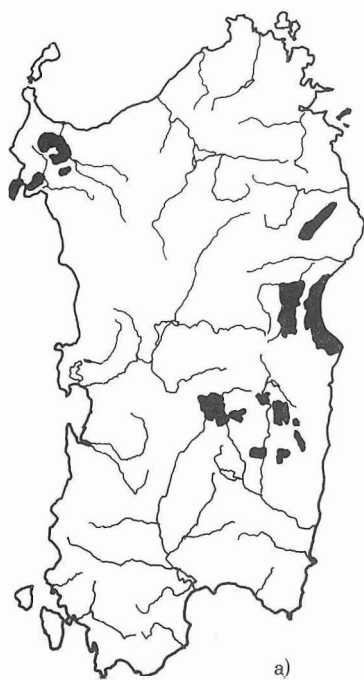
Fig. 1 - Main historical districts of Sardinia.

Geology

Geologically, Sardinia little resembles continental Italy; the geological history of the island has been very different from that of the Alps and Apennines, and the island, as the island of Corsica, has a much more ancient origin. One of the main geological characters which may be of interest for the lichenologist is the great variety of rock-types occurring on the island, from Cambrian to Quaternary eras; in general, siliceous rocks (of very different types) are more common than limestone or other calcareous rocks; the distribution of the main rock-types on the island is shown in Fig. 2.

Sardinia is composed of a Palaeozoic infrastructure and a Mesozoic and Cenozoic cover. The oldest outcrops, consisting of a succession ranging from the lower Cambrian to the lower Carboniferous, has been affected by an intense regional metamorphism. From the normal or barely epimetamorphic sediments in southwestern Sardinia there is a transition to phyllites, to mica-schists, to gneisses and then to magmatic-anatectic granites in northeast Sardinia (CHARRIER, 1958; VARDABASSO, 1966; CONTI & TRAVERSA, 1968, COCCOZZA, 1975).

The oldest layers of the Paleozoic sequence do not outcrop, with the exception of a small area close to Capo Spartivento (COCCOZZA, 1975). The



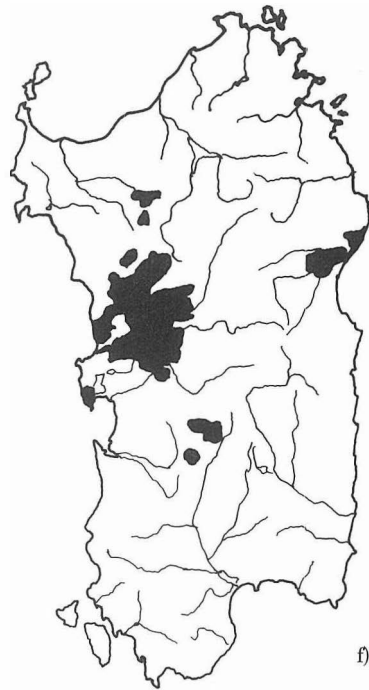
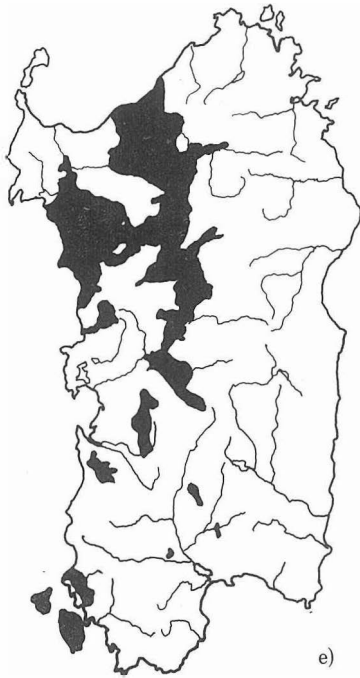


Fig. 2 - Main rock types in Sardinia
 a) limestone
 b) sandstone, marls
 c) granite
 d) metamorphic rocks
 e) lavas, tuffs
 f) basalt

oldest extensive outcrops are in the Iglesiente-Sulcis region; they range from the lower Cambrian to the lower Carboniferous. Volcanic activity in this area was not strong, and acid volcanic rocks are not known in the Iglesiente-Sulcis region. Another region with very old outcrops is the area situated to the northeast of Campidano, i.e. the vast region north of a line joining Capo Frasca on the west with Sarrabus-Gerrei in southeast Sardinia. The sediments are characterized by a succession of prevalently terrigenous rocks with the sedimentological characteristics of Flysch. Volcanic activity started with aerial eruptions of porphyries and continued throughout the Silurian with frequent and thick subaqueous porphyric eruptions (POMESANO CHERCHI, 1982; CALVINO, 1961).

To the Hercynian cycle belong the extensive granitic formations, which are most frequent in the northeastern, central and southeastern parts of the island. At the end of the Hercynian cycle Sardinia, or better the Corsica-Sardinia massif was completely emerged and still attached to the French-Spanish coast (DUBOURDIEU, 1962; DERCOURT, 1970). This position probably linked the Corsica-Sardinia massif with an approximately east-west alignment to the Iberian massif (COCCOZZA, 1975).

At the end of the Hercynian cycle a long period of orogenic quiet began in Sardinia, with only minor movements of slow subsidence. These conditions persisted through the Mesozoic and Cenozoic, permitting the ingression of epicontinental seas in some sectors of the island.

At the end of the Cuisian the ancient dislocation lines were reactivated with differential uplift of the various blocks into which the Sardinian massif was already divided. These movements produced gravity slides with local overthrusting and pseudo-reverse faulting as in the calcareous Monti di Oliena, M. Albo etc.

In the middle-upper Oligocene the tectonic movements reached their maximum intensity, leading to an intense volcanic activity of prevalently andesitic and rhyolitic type (LAURO & DERIU, 1957). The lavas and pyroclastic products of this activity accumulated mainly in tectonic depressions.

In the Miocene the sea returned once more to the island, but occupied only the tectonically depressed areas, including a low area that existed at that time between Sardinia and Corsica, perhaps separating them for the first time.

At the end of Miocene there was a phase of adjustment followed in the Pliocene by basaltic volcanism (e.g. Giara di Gesturi).

The geological evolution of Sardinia is thus characterized by a whole series of progressively shorter sedimentary cycles, which were interrupted by marked discordances; the present facies are prevalently of epicontinental or continental environment, notwithstanding the scarcity of carbonatic and evaporitic rocks (COCCOZZA, 1975).

Climate and Vegetation

The climate of Sardinia and its influence on the natural vegetation have been the subject of a monograph by ARRIGONI (1968) which is still the best and most fundamental introduction to the main aspects of the vegetation of the island. According to ARRIGONI (1968) the climate of Sardinia is of temperate-warm type, with an alternation between a warm-arid and a cold-humid season. Temperatures tend to decrease from the sea towards the interior, and from the south to the north of the island. Precipitation is lowest along the coast, particularly in the south (less than 700 mm/year), and progressively increases towards the north and in the mountains; the sites located at higher elevations, particularly those on the Gennargentu-massive, have a precipitation of more than 1000 mm/year. In all climatic diagrams (see Fig. 3) there is a more or less pronounced water deficit during summer, typical of a Mediterranean climate. The stations located at the north of the island and in the mountains have a shorter summer drought and an abundant water surplus in the cold season. It is possible to distinguish at least three main climatic types: an arid Mediterranean climate on the coast and in the lowlands, a subhumid Mediterranean climate in the lower mountains and a humid Mediterranean climate on the highest mountains.

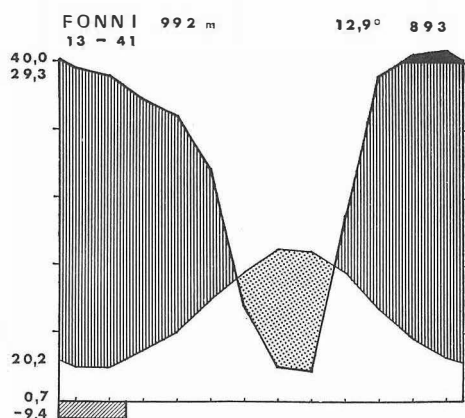
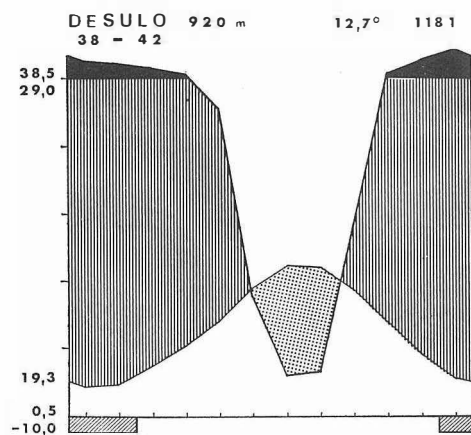
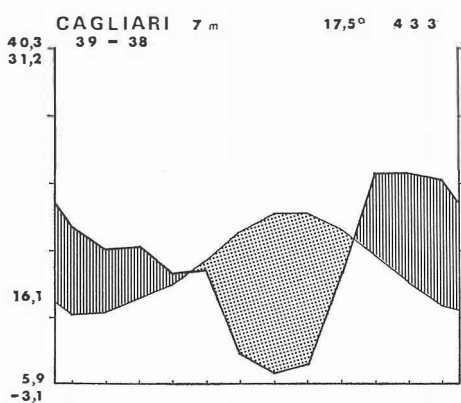
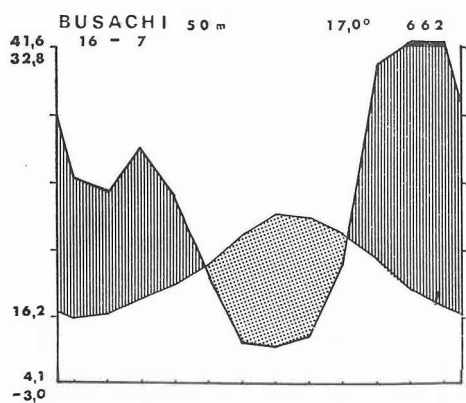
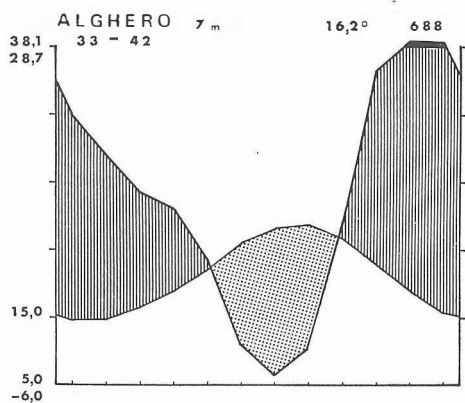
The first important contributions to the knowledge of the vegetation of Sardinia are those by HERZOG (1909) and TERRACCIANO (1909), who studied the major formation types from the coast to the mountains and described many aspects of the plant cover of the island. Another important contribution is the paper of BEGUINOT (1923), treating several aspects of the forest vegetation of the island. The number of relevant studies on the vegetation of Sardinia was not very high until the post-war period when, thanks to the activity of the botanists of the Universities of Cagliari and Sassari, and of other Italian and foreign universities, an increasing number of biotopes have been the object of detailed study (for a comprehensive bibliography of geobotanical literature concerning Sardinia see VALSECCHI 1980).

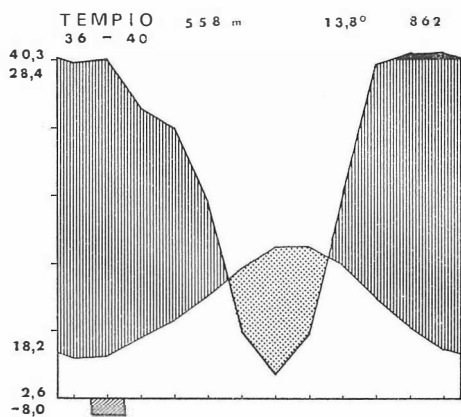
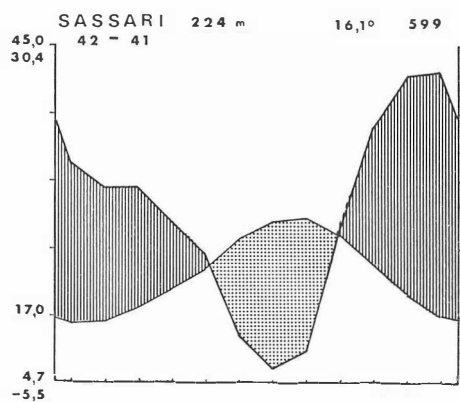
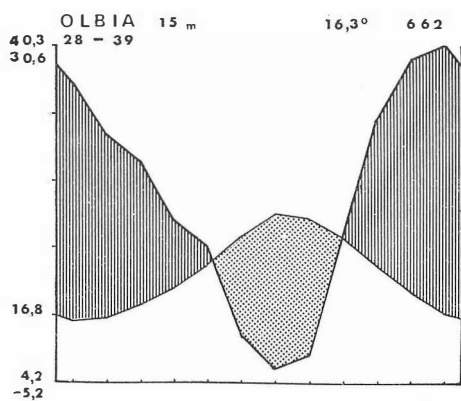
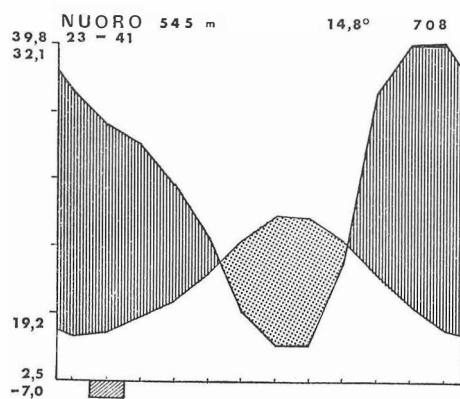
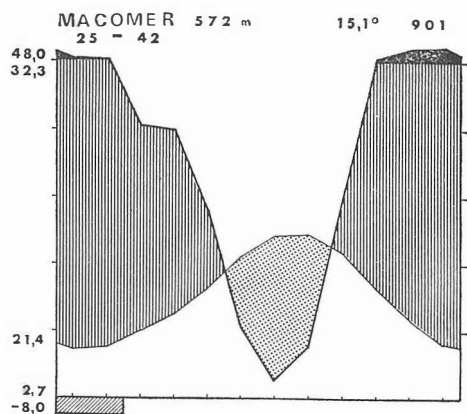
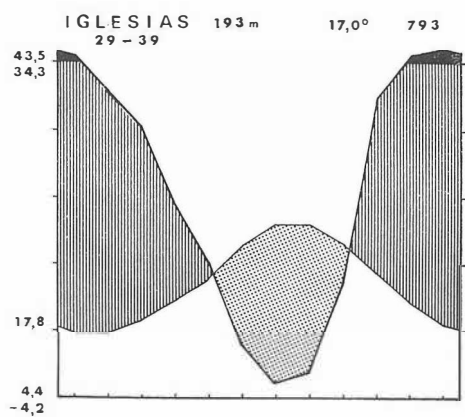
ARRIGONI (1968) proposed a subdivision of the natural vegetation of the island into climax-types. On the basis of climatic and vegetation parameters he distinguished three main climax types (see map of Fig. 4):

1 - Climax of thorny cushion shrubs and Mediterranean montane steppes.

This is a vegetation dominated by low, hemispherical, often thorny shrubs such as *Astragalus genargenteus*; also frequent are: *Juniperus nana*, *Berberis aetnensis*, *Prunus prostrata*, *Daphne oleoides*, *Thymus herba-barona* etc. This climax occurs only on the highest ridges of the mountains; well developed stands are frequent in the Gennargentu-massive; fragments of this vegetation also occur on M. Limbara, M. Linas, M.

Fig. 3 - Climate diagrams (drawn following Walter & Lieth (1960) of selected localities from Sardinia).





Genziana, M.S. Vittoria, Montiferru.

The climate is typically montane, cold, with a winter season (days with average temperature less than 10°C) lasting 6-7 months and a minimum average temperature of the coldest month lower than - 1-3 °C. Snow is frequent during winter. The summer drought lasts only two months and it is mitigated by frequent fogs. The vegetation is subject to strong winds throughout the year.

The thorny cushion stands of Mediterranean Italy have also been studied by PIGNATTI et al. (1980) and by NIMIS (1981). They are most probably a relict type of vegetation, with some affinities with an analogous formation whose distribution centre is on the mountains of the Irano-Turanian region.

2 - Climax of *Quercus ilex* forests.

Quercus ilex is the dominant tree species throughout the island, from the lowlands to the montane belt (see fig. 5), but not everywhere does it form typical, well-developed woody stands. This climax-type has been subdivided by ARRIGONI (1968) into two horizons:

- a) Cold-humid horizon of the montane forest with *Quercus ilex* and *Quercus pubescens*, with relict elements of the mixed forests dominated by species of the *Quercus-Tilia-Acer* belt (sensu SCHMID 1933) and by *Ilex aquifolium*.

Included are forests where *Quercus ilex* may be dominant, but where xerophytic plants are rare and mesophytic and hygrophytic elements are frequent. The woods are often dominated by *Quercus pubescens* (see fig. 6) in the coldest areas of the north or on moister soils. Stands dominated by *Castanea sativa*, relatively frequent in central Sardinia, are mainly encouraged by the human activity. Locally, more or less dense stands dominated by *Ilex aquifolium* and *Taxus baccata* do still occur in the mountains; they probably represent the last remnants of a vegetation belt which must have been much more widespread in the past, and that has a clearly ancient, relict character, since it occupies the niche which, in the rest of Italy, is filled by *Fagus sylvatica* and *Quercus cerris* (trees which are absent from Sardinia).

This horizon is most frequent between 800 and 1300 m in northern Sardinia on the mountains and plateaus of the Catena del Marghine, in the inner northwestern part of the island on calcareous-clayey soils and in the northwestern portion of the Gennargentu Massive.

The climate is characterized by humid winters and high water surplus. The cold season lasts more than 4 months; the average minimum temperature of the coldest month is lower than 3°C. The summer drought lasts less than three months, with a moderate water deficit. The average temperature of the warmest month is less than 24°C.

Indicator species include: *Quercus pubescens*, *Taxus baccata*, *Ilex*

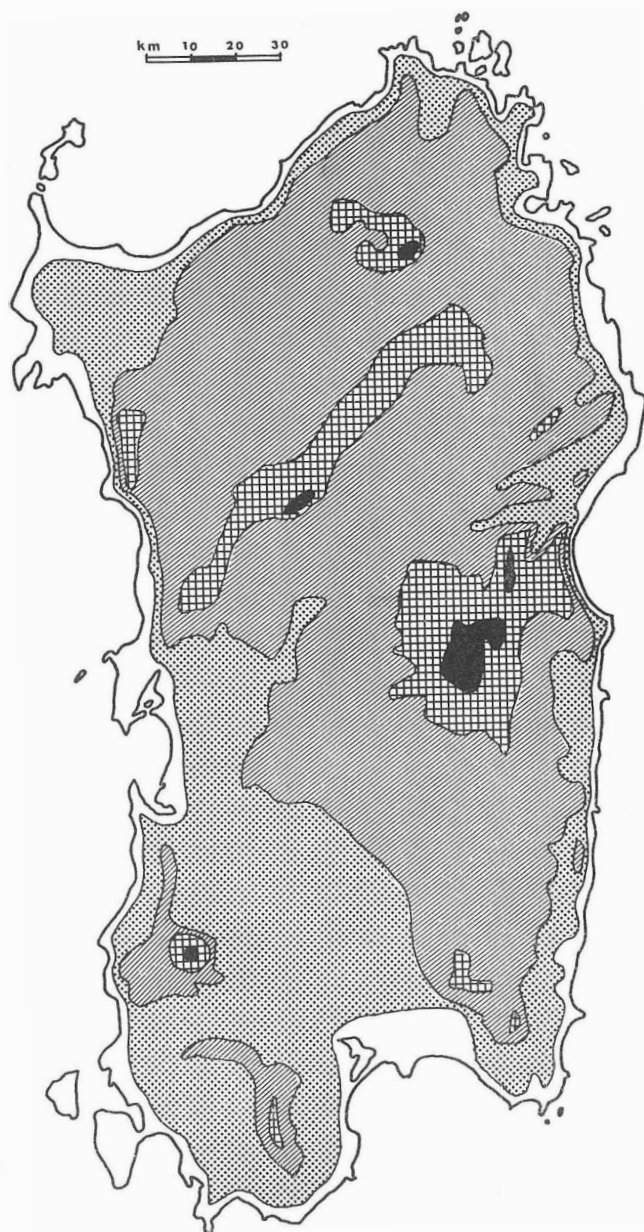


Fig. 4 - Main climax types in Sardinia (from Arrigoni 1968)

- black: thorny cushion shrubs.
- quadrats: cold-humid horizon of *Quercus ilex* and *Q. pubescens* forests.
- transverse lines: mesophytic horizon of *Quercus ilex* forests.
- dotted: horizon of the mixed sclerophyllous evergreen forests.
- white: horizon of coastal maquis.

aquifolium, *Acer monspessulanus*, *Ostrya carpinifolia* etc.

b) Mesophytic horizon of *Quercus ilex* forests.

This includes closed or open *Quercus ilex* stands and their degraded stages, located on the lower mountain slopes and hills of northern and central Sardinia; this horizon also occurs in the mountains of Sulcis, Iglesiente and Sarrabus in southern Sardinia. Locally, above all in the north of the island (see Fig. 7), the dominant or co-dominant tree is *Quercus suber*, whose distribution, however, has been largely extended by man.

The climate is characterized by a moderately cold, subhumid winters, with a slight water surplus, and a warm summer with pronounced water deficit. The cold period lasts 2-4 months. The average of the yearly minimum temperature is always higher than -4°C . The dry period lasts more than three months, with the average temperature of the warmest month higher than $23-24^{\circ}\text{C}$ and the maximum temperature of the same month around 30°C .

No true indicator species is cited by ARRIGONI (1968); the horizon is characterized by the high frequency of elements typical of *Quercus ilex* forests, such as *Viburnum tinus*, *Ruscus aculeatus*, *Rubia peregrina*, *Phillyrea latifolia*, *Pistacia terebinthus* etc., and by a lower frequency of the mesophytic species characteristic of the previous horizon.

3 - Thermoxerophytic climax of the mixed sclerophyllous forests and of the coastal maquis.

Also this climax-type has been subdivided by ARRIGONI (1968) in two main horizons.

a) Horizon of the mixed sclerophyllous evergreen forests.

This includes a mixed scrub formation dominated by *Quercus ilex* and *Quercus coccifera*, with a prevalence of thermophytic and strongly xerophytic plants.

It occurs mainly in southern Sardinia, on the hills and the valleys of the interior, and on the lower slopes of the calcareous mountains in central-eastern Sardinia. The stands of southern Sardinia, particularly those located on flat ground or gentle slopes have mostly disappeared as a consequence of agricultural exploitation.

The climate is semiarid, with very slight water surplus during winter and high water deficit during summer. The dry period lasts 3.5-4.5 months, with average yearly maximum temperature around $36-40^{\circ}\text{C}$. The cold period rarely lasts more than two months and is not very pronounced. The average minimum temperature of the coldest month is around $3-4^{\circ}\text{C}$ and the average of the yearly minima is generally higher than -2°C .

Indicator species: *Quercus coccifera*, *Rhamnus alaternus*, *Genista*

morisii, *Nerium oleander*, *Phillyrea angustifolia*, *Artemisia arborescens*, *Ruta chalepensis*, *Genista ephedroides*, *Calicotome villosa*.

b) Horizon of the coastal maquis.

This horizon differs from the previous one for the presence of several coastal species, and somewhat corresponds with the vegetation called "Oleo-Ceratonion" by phytosociologists. To this horizon belong also the coastal *macchia* formations dominated by *Chamaerops humilis* and/or by *Euphorbia dendroides*, and the few remnants of natural, coastal pine-woods (*Pinus halepensis*) localized in scattered stations of southern Sardinia.

The vegetation of this horizon occurs around the coasts of the island, with an optimum in southern and eastern Sardinia, in the Nurra region and on some minor islands.

The climate is semiarid, with warm summer and strong water deficit. The maximum temperatures, however, are mitigated by the effect of the sea. The cold period is almost inexistent, and the water surplus during winter is very scarce.

Indicator species: *Chamaerops humilis*, *Anagyris foetida*, *Euphorbia dendroides*, *Juniperus phoenicea*, *Juniperus macrocarpa*, *Stipa retorta*, *Thymus capitatus*, *Poterium spinosum*, *Ceratonia siliqua*, *Asparagus aphyllus* etc.

The human impact on the natural vegetation of Sardinia has been very substantial and of long duration. The economy of the first inhabitants of the island was mainly based on sheep-grazing, an activity that still persists today, so that the destruction of the natural forests and their substitution with pastures dates back to a very long time. However, in the last century vast areas of forest vegetation still persisted in the interior of the island, their destruction mainly occurring after the unification of Italy. After the Second World War the industrial and the tourist exploitation of the coast resulted in profound modifications of the surviving remnants of natural or semi-natural vegetation. Certain aspects of the present situation are disastrous; natural woods are now extremely rare, many interesting coastal biotopes have been eliminated by hotels and tourist villages, and over wide areas of the island the degradation of the vegetation has reached an almost irreversible stage. The picture outlined by ARRIGONI (1968) refers to a hypothetical natural vegetation reconstructed from its few remnants, whereas the now existing vegetation is characterized by the total dominance of degraded stages of the climax-stands; a traveller through the island will be impressed by the frequency and extensiveness of sterile meadows dominated by *Asphodelus*, by hills covered by *Cistus*-species, and by the high frequency of summer fires, which mostly are not of natural origin.

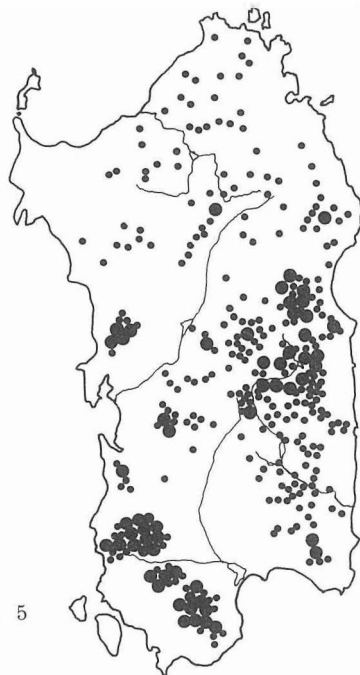


Fig. 5

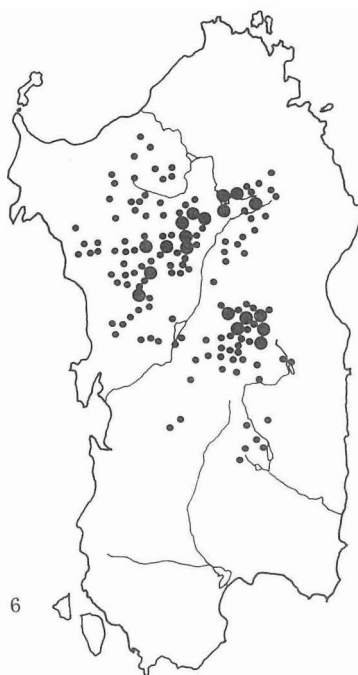


Fig. 6

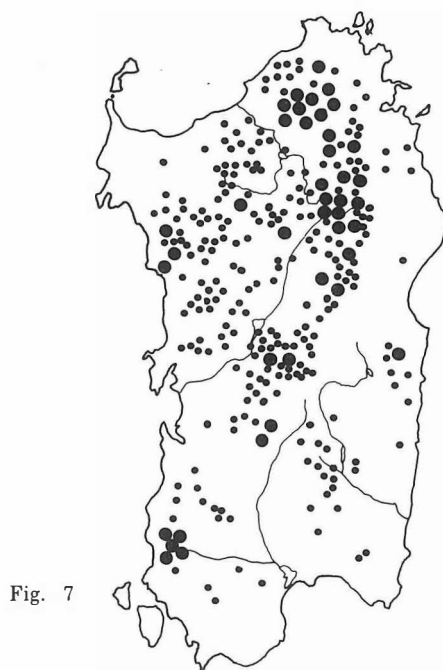


Fig. 7

Fig. 5 - Distribution of *Quercus ilex* - woods. Large dots indicate woods of ca. 1000 Ha., small dots indicate woods to 200 Ha. (Redrawn from Arrigoni, 1968).

Fig. 6 - Distribution of *Quercus pubescens* - woods. Large dots indicate woods of ca. 500 Ha. Small dots indicate woods to 100 Ha. (Redrawn from Arrigoni, 1968).

Fig. 7 - Distribution of *Quercus suber* - woods. Large dots indicate woods of ca. 1000 Ha. Small dots indicate woods to ca. 100 Ha. (Redrawn from Arrigoni, 1968).

The flora

The main phytogeographical aspects of the flora of Sardinia have been treated by FORSYTH-MAYOR (1883), HERZOG (1909), TERRACCIANO (1909), SCHMID (1933) and ARRIGONI (1980). According to ARRIGONI (1980), however, the knowledge of the flora of Sardinia is not yet complete, and the taxonomy of several entities still needs to be clarified, as was demonstrated by the recent revisions by ARRIGONI (1970), ATZEI & PICCI (1977) and VALSECCHI (1977,1979). Even the exact number of taxa known to occur in Sardinia is not clear: FIORI (1926-1929) cited 1565 species plus 380 infraspecific taxa giving a total of 1950 entities. Flora Europaea recognizes 1768 species, whereas PIGNATTI (1982) gives a total of 2013 species. As far as bryophytes are concerned, a study by BISCHLER & JOVET-AST (1972) provides a list of 68 infrageneric taxa of hepatics, and a recent compendium of mosses by CORTINI-PEDROTTI (1980) cites 315 species, 29 subspecies and 126 varieties.

A subdivision of the vascular flora of Sardinia in phytogeographical elements has been attempted by SCHMID (1933); based on a total of 1950 species, 835 belong to the eumediterranean element, 169 to the western-mediterranean element, 184 to the eurasiatic element, 178 are endemic and the remainder belong to other phytogeographical elements. Of interest is the high incidence of endemic species (see also ARRIGONI et al. 1976-1983, CAMARDA 1984), and the relatively low incidence of boreal species (84). The number of endemics is still higher considering the plants whose distribution is restricted to Sardinia and Corsica.

Two considerations are important for a correct understanding of the phytogeographical features of the Sardinian flora:

a) Corsica and Sardinia have a similar biogeographical history, reflected in the high number (ca. 60 species) of common endemics and of vicariant species. The differences in their floras are mainly due to differences in the climate, which is more warm and arid in Sardinia (ARRIGONI, 1980).

b) Part of their flora is of very ancient origin, and evolved in conditions of insular isolation for very long periods. Most of the paleoendemic taxa derived from a paleogenic flora of tropical nature (ARRIGONI 1980). Of particular interest also is the presence of species with a disjunct distribution, including the Iberian Peninsula or the Balearic Islands and Sardinia, which can be related to the tectonic history of the western Mediterranean basin. Other taxa are common to Sardinia, Sicily and North Africa; this, according to ARRIGONI (1980), could be related to the drought crisis which affected the Mediterranean region during the Messinian period. Finally there is a small group of boreal or boreal-montane plants that reached Sardinia via Corsica during the quaternary glaciations. For more details on the biogeography of Sardinia we refer to the volume edited by BACCETTI (1980).

Lichenology in Italy and the previous lichenological research in Sardinia

The "golden age" of Italian lichenology dates from 1850 to 1880. More than 50 % of all lichenological publications by Italian authors were issued within these three decades, and the overall standard was very high. In the following years there was a sharp decline in both the number and the quality of lichenological articles, and in the first decades of this century the number of active Italian lichenologists was reduced to five, none of which achieved international status. After the 1920's Italian lichenology was chiefly represented by three workers: M. Cengia-Sambo (1888-1939), C. Sbarbaro (1888-1967) and R. Tommaselli (1920-1983); none left a school.

The main reason for the rapid development of lichenology in Italy after 1850 lies in the invention of a new microscope with achromatic lenses by G. Amici. A. Massalongo (1824-1860), perhaps the greatest Italian lichenologist, received the new instrument directly from Amici, and the possibilities thereby offered opened a field of research in which an important role was given to microscopic characters, such as the size and shape of the spores. This introduced interesting developments in systematics, with the publication of pioneering studies by G. De Notaris (1805-1877), V. Trevisan (1818-1897) and Massalongo himself, which soon became the object of discussion and often also of polemics at international level.

The great interest for the lichens, aroused by the fundamental contributions of De Notaris, Massalongo and Trevisan, brought a period of intensive floristic research in different parts of the country: among the best lichenologists of the period were S. Garovaglio (1805-1882), M. Anzi (1812-1883), A. Carestia (1825-1908) and F. Baglietto (1826-1916).

The dramatic decline of Italian lichenology in the second half of the 19th century is mainly due to political reasons; after the unification of the country the government decided to transfer courses of Botany from the Faculty of Medicine to the Faculty of Sciences, at the same time issuing clear directives aimed at favouring the development of applied botany at expense of a taxonomic-floristic approach, which was considered as outdated and not corresponding with the contemporary needs of the new country. The effects of this policy were devastating: A long botanical tradition by physicians and pharmacists was interrupted, the new positions opened by the reform were mostly occupied by plant physiologists or agronomic botanists (De Notaris himself, despite his international fame, became full professor in 1872 at the age of 67), and the few remaining taxonomists active in cryptogamic studies shifted their interest to the study of plant

diseases (the story of S. Garovaglio and of the Laboratorio Crittogamico of the Pavia University is very emblematic in this sense).

When, at the end of the century, some botanists proposed the compilation of a "Flora Italica Cryptogama", there were already problems finding a person who could be able to fulfill the job for the lichens. Ultimately the work was carried out by A. Jatta (1852-1912), who was not active in any university and lived most of his life in a small village of southern Italy.

The result of such an historical development is that it is difficult to assess what is the present status of lichenological knowledge regarding Italy: on one hand there is a number of excellent floristic works dating back to the "golden age" of Italian lichenology, which covers wide and phytogeographically interesting parts of the country, on the other hand very little has been done in recent times, so that it is difficult to update the ancient floristic records to the standard required by the subsequent developments of lichen taxonomy, since the collections of ancient authors were often unavailable to specialists.

This is the situation that we encountered at the beginning of this study.

The first lichen records from Sardinia are in the classical work of MORIS (1829) on the flora of the island, who cites a list of 90 taxa. De Notaris also collected lichens in Sardinia; it is unfortunate that he never published an extended account of his floristic research on the island, since the lichen herbarium of De Notaris has apparently being in part lost.

Some records are cited in DE NOTARIS (1846, 1847, 1852a, 1852b), where he also described some new species. Part of his material was also sent to Massalongo, who published scattered accounts in MASSALONGO (1852a, 1852b, 1853). All these records are included in the most important contribution to lichen floristics in Sardinia, which is the study by BAGLIETTO (1879). Baglietto never visited Sardinia; his publication is based on numerous good collections that were sent to him by the professors of botany P. Gennari, E. Marcucci, R. Gestro, and by G. Canepa; furthermore, he had access to the herbarium of Moris, and critically revised most of the taxa cited in MORIS (1829). Some of the specimens cited by BAGLIETTO (1879) were distributed, before the publication of the article, in the Erbario Crittogamico Italiano, and sometimes described there as new taxa. His paper includes the citation of 317 taxa at specific level, plus 80 further taxa at infraspecific level designed with letters of the greek alphabet, for a total of 397 lichen taxa. 16 species and 15 infraspecific taxa are described as new.

The material sent to Baglietto by his collaborators should have been very abundant, as duplicates from several collections cited in Baglietto's paper are now deposited in NAP, RO, FI and also in some foreign herbaria. The exact location of the original material used by Baglietto for his

publication, however, was not known with certainty, until we located a large collection of material from Sardinia in the herbarium of the Botanical Institute of the University of Modena (MOD), which proved to contain almost all of the collections cited by BAGLIETTO (1879), including the specimens of the Herbarium Moris. This enabled us to check Baglietto's identifications in most cases in which this seemed necessary.

The type material of the majority of taxa described by BAGLIETTO (1879) was also located: the study of this material is not yet finished and in this book we treat only a part of the taxa, particularly those described as new species.

The paper by BAGLIETTO (1879), which should have encouraged the further developments in the lichenological exploration of Sardinia, was issued just at the beginnings of the rapid decline of Italian lichenology. For about 40 years there was almost no further new record of lichens from the island: BARBEY (1884), in his list of Sardinian plants, reports only the taxa listed by BAGLIETTO (1879), and scattered records, mostly taken from previously cited publications appeared in some of the papers by Jatta, in a short note by PASQUALE (1868) and in a paper by MAGRETTI (1880).

Altogether, up to 1917 the list of taxa known to occur in Sardinia was increased by just 15 species. It is in the second decade of this century that two further contributions appear, one by COLOSI (1917) and the other by MAMELI (1920).

The paper by COLOSI (1917) contains a list of 115 species, most of which were identified by Jatta, with the description of two new varieties. Most of the species were already known from Sardinia, and, in general, the paper by COLOSI (1917) cannot be considered as a relevant advance in the floristic knowledge of the island.

The same consideration applies to the contribution by MAMELI (1920); her citations refer partly to samples collected by De Notaris in 1863, and sent by him to S. Garovaglio, partly to her own collections; all of the material was identified by Mameli herself, who was mostly active in plant physiology and cannot be considered as an expert taxonomist. 60 taxa are cited as new to the lichen flora of Sardinia, but most of them are evidently simply morphotypes. We have not checked the original collections on which MAMELI's paper is based, but we have the impression that her identifications have to be considered with great prudence, so that in the present book not all of her records are accepted.

After the papers by COLOSI (1917) and MAMELI (1920) no further substantial contribution to the lichen flora of Sardinia has appeared. Most the subsequent, very scarce, records refer to occasional reports contained in larger taxonomic monographs and are mostly due to the revision of some exiccata cited by BAGLIETTO (1879).

Discussion

The following considerations are a first attempt to discuss the results of our recent work on the island, which constitutes a good part of the catalogue.

The catalogue contains a list of 901 taxa of lichens and lichenicolous fungi. This number comprises 849 species and 52 taxa at infraspecific level. We are convinced that the lichen flora of Sardinia is much richer; as it is evident from the map of the collecting sites (fig. 9), in Sardinia there are still many unexplored areas. As the present stand of knowledge is still incomplete, we refrain from any quantitative evaluation. A comparison with the lichen flora of Corsica, as known from the paper of WERNER (1973) has not been attempted, since in many cases the species concept adopted by this author considerably differs from that used in this list.

1 New taxa and new combinations

Although Europe is one of the lichenologically best explored parts of the world, in the last years many new taxa have been described from this continent, which means that we are still far from a complete knowledge of the European lichen flora. This is particularly true for such an isolated area as Sardinia, which, in addition, has not been thoroughly studied for more than a century.

Thirteen taxa are described as new in this paper. The varietal level has been used in all cases where, in our opinion, a population is clearly different from a nearly allied species, but it is not yet clear whether it actually deserves to be treated at species rank. Future changes in the taxonomical rank of these varieties are probable.

The new taxa are:

- Aspicilia hydrocharis* Poelt et Nimis
- Caloplaca inconnexa* var. *nesodes* Poelt et Nimis
- Caloplaca interna* Poelt et Nimis
- Caloplaca ora* Poelt et Nimis
- Caloplaca rinodinae-albae* Poelt et Nimis
- Caloplaca sarda* Poelt et Nimis
- Lecidella achristotera* var. *juniperina* Poelt et Nimis
- Lecidella vorax* Leuckert et Poelt
- Placopyrenium* gen. nov. O. Breuss
- Rhizocarpon fraticida* Poelt et Nimis
- Rhizocarpon lusitanicum* var. *ochrolechia* Poelt et Nimis
- Scoliciosporum gallurae* Vězda et Poelt
- Xanthosorella llimonae* Hertel, Egea & Poelt

The following new combinations are proposed in this paper:

Catapyrenium adami-borosi (Szatala) O. Breuss
Lecania inundata (Hepp ex Koerber) M. Mayrhofer
Lecania sylvestris var. *umbratica* (Arnold) M. Mayrhofer
Lecanora bicincta var. *sorediata* (Flot.) Leuckert et Poelt
Physcia scopulorum (Lambinon et Vežda) Poelt et Nimis
Placopyrenium bucekii (Nadvornik et Servit) O. Breuss
Placopyrenium trachyticum (Haszlinsky) O. Breuss
Porpidia platycarpoides (Bagl.) Hertel
Protoparmelia montagnei (E. Fries) Poelt et Nimis
Staurothele terricola (Bagl.) Poelt et Nimis
Stigidium glebarum (Arnold) Hafellner

2 Rare species

In the following we give a list of taxa which, as far as their taxonomic circumscription and the knowledge of their distribution allow, may be considered as important finds for Sardinia. Not included are widespread species that were not known from the island and whose occurrence there was, however, to be expected. Of particular interest is a group of species with western distribution (W), that often were only known from the Iberian Peninsula. Further discussions are in the notes attached to each taxon.

<i>Acarospora modenensis</i>	few records from the Mediterranean region
<i>Acarospora sphaerospora</i>	second record
<i>Arthopyrenia strontianensis</i>	only a few records
<i>Aspicilia simoensis</i>	northern and central Europe
<i>Buellia reagens</i>	W
<i>Caloplaca chrysophthalma</i>	northern and central Europe, declining
<i>Caloplaca interfulgens</i>	northern Africa
<i>Caloplaca littorea</i>	west European coast
<i>Caloplaca proteus</i>	central, rarely northern Europe
<i>Caloplaca subochracea</i> v. <i>luteococcinea</i>	- western Mediterranean region
<i>Catapyrenium adami-borosii</i>	few records
<i>Coelocaulon crespoe</i>	W - central Spain
<i>Cyphelium lecideinum</i>	very scattered distribution
<i>Diploicia subcanescens</i>	west European coasts
<i>Gorgadesia mira</i> ?	Capo Verde Islands
<i>Karschia talcophila</i>	rare in central Europe, common in Sardinia
<i>Lasallia brigantium</i>	Corsica
<i>Lecanora lisbonensis</i>	W
<i>Lecanora ochroidea</i>	France
<i>Lecanora silvae-nigrae</i>	central Europe
<i>Lecidea assimilis</i>	central and northern Europe, scattered

<i>Leptochidium albociliatum</i>	very unclear distribution pattern
<i>Nephroma tangeriense</i>	W
<i>Niesslia cladoniicola</i>	second record
<i>Ochrolechia crozalsiana</i>	very rarely collected
<i>Pertusaria conglobata</i>	second record
<i>Pertusaria graeca</i>	Greece, Corsica
<i>Protoblastenia lusitanica</i>	W
<i>Ramalina arabum</i>	broad, tropical, scattered range
<i>Ramalina clementeana</i>	W
<i>Ramalina subgeniculata</i>	W
<i>Rhizocarpon dinotethes</i>	mountains of central Europe
<i>Rinodina confinis</i>	W - Portugal
<i>Rinodina fimbriata</i>	scattered distribution in Europe
<i>Rinodina furfuracea</i>	W - Portugal
<i>Rinodina melanocarpa</i>	scattered distribution in Europe
<i>Rinodina obnascens</i>	W
<i>Rinodina sicula</i>	Sicily, Elba, Tuscany
<i>Rinodina sorediata</i>	W - Portugal, Canary Islands
<i>Rinodina vezdae</i>	scattered distribution in Europe
<i>Solenopsora holophaea</i>	W
<i>Thelomma siliceum</i>	very rare in the Mediterranean area
<i>Toninia toepfferi</i>	W - Spain, Islands of the Atlantic
<i>Trapeliopsis wallrothii</i>	W
<i>Weddellomyces epicallopisma</i>	very rare in western Europe

3 - The lichen flora

One of the first remarks on the phytogeographical characterization of the lichen flora of Sardinia is that several species-rich genera which are generally an important element in other parts of the Mediterranean area are weakly represented on the island. Among them are *Parmelia* s. lat., *Parmotrema*, *Staurothele* and *Thelidium*. Furthermore, many otherwise common species seem to be rare on the island (e.g. *Candelaria concolor*, *Parmelia glabratula*, *P. subrudecta*, *P. glabra* etc.). At the other side there is a number of genera (above all of crustose lichens), which in Sardinia are represented by a high number of species, and in a certain sense characterize the lichen flora of the island. Among them are *Buellia*, *Caloplaca*, *Lecanora*, *Pertusaria*, *Rinodina* and *Ramalina*. This fact may be due to the great variety of rock-types occurring on the island, although we doubt that this could be the only reason.

In the following we try to distinguish some main phytogeographical elements in the lichen flora of Sardinia; several taxa obviously cannot be assigned to any element, for other taxa too little is known about their distribution, so that in future they might prove to belong to a different element, and the subdivision itself should be considered as a first

attempt.

- Temperate element : many lichen species are widely distributed in more than one zonobiome, other belong to the temperate element, which in Sardinia is richly represented, above all in the montane vegetation belt. Of course, it is of little interest to list here the most important representatives of this element.

- Arctic-alpine to Boreal-montane element: the two elements are difficult to distinguish, and not only in Sardinia. Many taxa occurring in the high European mountains should be considered as oreophytes whose distribution extends also to other mountain ranges outside Europe. In Sardinia the species of this group are particularly frequent at higher elevation, above all on the Gennargentu-mountains. The presence of many "northern" lichen species on the higher mountains constitutes a main phytogeographical difference with the vascular flora, which in Sardinia, in contrast to Corsica, is notoriously poor of arctic-alpine to boreal plants (ARRIGONI,1980). Among the representatives of this group we cite the following taxa:

Brodoa atrofusca	Brodoa intestiniformis
Caloplaca fulvolutea	Cetraria hepatizon
Cladonia macrophyllodes	Cornicularia normoerica
Lecanora bicincta	Lecanora swartzii
Lecidea confluens	Lecidea deustata
Lecidea nigroleprosa	Lecidea promiscua
Lecidea swartzioidea	Massalongia carnosa
Parmelia omphalodes	Parmelia stygia
Pertusaria corallina	Pseudephebe minuscula
Pseudephebe pubescens	Psoroma hypnorum
Rhizocarpon badioatrum	Rinodina milvina
Schaereria tenebrosa	Umbilicaria crustulosa
Umbilicaria cylindrica	Umbilicaria deusta
Umbilicaria polyphylla	

some species, such as Cornicularia normoerica and Massalongia carnosa have a more western (Atlantic) distribution. The following species should be considered as "boreal":

Cetraria pinastri	Cladonia arbuscula s. lat.
Cetraria chlorophylla	Cladonia coccifera
Chaenothecopsis subpusilla	Parmeliopsis ambigua

The species whose distribution is centered on the Mediterranean region may be assigned to the following phytogeographical elements:

- Mediterranean element: truly Mediterranean species are restricted to, or much more frequent in the eumediterranean vegetation belt, corresponding

to the climax formation of *Quercus ilex*-woods. In the northern part of the Mediterranean region they are most frequent at low altitudes, whereas in the south they have a broader altitudinal range. Here it should be remarked that in some of the Canary Islands there is a very narrow vegetation belt (now almost entirely occupied by cultivations) with a quasi-Mediterranean climate, where some of the species listed below do also occur. The same applies for some Mediterranean-montane species, which we prefer, however to treat separately from the oceanic or suboceanic species, which have a much wider distribution. The phytogeographical relations between the lichen floras of the Mediterranean region proper and of Macaronesia would be worthy of a detailed study. As more or less typical representatives of the Mediterranean element we cite the following taxa:

<i>Acarospora hilaris</i>	<i>Acarospora microcarpa</i>
<i>Acarospora modenensis</i>	<i>Caloplaca fuscoatroides</i>
<i>Caloplaca pollinii</i>	<i>Caloplaca subochracea</i>
<i>Cladonia convoluta</i>	<i>Cladonia firma</i>
<i>Cladonia mediterranea</i>	<i>Collema rysssoleum</i>
<i>Dermatocarpon insulare</i>	<i>Fulgensia fulgida</i>
<i>Fulgensia subbracteata</i>	<i>Lecania spadicea</i>
<i>Lecanora bolcana</i>	<i>Lecanora lividocinerea</i>
<i>Lecanora poeltiana</i>	<i>Lecanora prominens</i>
<i>Lecanora puniceofusca</i>	<i>Lecanora rubicunda</i>
<i>Parmelia luteinotata</i>	<i>Pertusaria apennina</i>
<i>Pertusaria dalmatica</i>	<i>Pertusaria graeca</i>
<i>Pertusaria mammosa</i>	<i>Pertusaria melanochlora</i>
<i>Pertusaria rupicola</i>	<i>Placolecis opaca</i>
<i>Placopyrenium bucekii</i>	<i>Psora gresinonis</i>
<i>Ramalina clementeana</i>	<i>Ramalina canariensis</i>
<i>Ramalina pusilla</i>	<i>Ramalina requienii</i>
<i>Rhizocarpon lusitanicum</i>	<i>Rhizocarpon oportense</i>
<i>Rhizocarpon tavaresii</i>	<i>Rhizocarpon tetrasporum</i>
<i>Rhizocarpon tinei</i>	<i>Rinodina alba</i>
<i>Rinodina cretica</i>	<i>Rinodina sicula</i>
<i>Rinodina subglaucescens</i>	<i>Schismatomma picconianum</i>
<i>Solenopsora olivacea</i>	<i>Solenopsora bagliettoana</i>
<i>Solenopsora vulturienensis</i>	<i>Squamarina conrescens</i>
<i>Squamarina periculosa</i>	

Also several *Buellia*-species should be assigned to this group; their phytogeographical arrangement is left to a future paper by Ch. SCHEIDEGGER (in prep.). It is possible that some of the taxa listed above could also be assigned to the following element when more data will be available about their distribution and ecology.

- Submediterranean and Mediterranean-montane element: these taxa have a

distribution centered in the submediterranean zone, i.e. in the area dominated by *Quercus pubescens* woods, where precipitation is higher than in the Mediterranean zone and the humid period extends to the early summer. This element is linked with many overlappings at one side to the Mediterranean element, and to the Temperate element at the other side. Taxa belonging here are:

<i>Aspicilia cupreoglauca</i>	<i>Aspicilia farinosa</i>
<i>Aspicilia microspora</i>	<i>Caloplaca conglomerata</i>
<i>Caloplaca haematites</i>	<i>Caloplaca inconnexa</i>
<i>Caloplaca oasis</i>	<i>Caloplaca ochracea</i>
<i>Caloplaca tenuatula</i>	<i>Candelariella medians</i>
<i>Lecanora pruinosa</i>	<i>Lecanora ripartii</i>
<i>Lecanora sienae</i>	<i>Ochrolechia balcanica</i>
<i>Parmelia carporrhizans</i>	<i>Parmelia contorta</i>
<i>Parmelia glabra</i>	<i>Physcia biziana</i>
<i>Physconia petraea</i>	<i>Physconia servitii</i>
<i>Physconia subpulverulenta</i>	<i>Physconia venusta</i>
<i>Placocarpus schaererii</i>	<i>Placopyrenium trachyticum</i>
<i>Rinodina dubyana</i>	<i>Rinodina lecanorina</i>
<i>Rinodina trachytica</i>	<i>Rinodina tunicata</i>
<i>Rinodinella controversa</i>	<i>Rinodinella dubyanoides</i>
<i>Squamaria cartilaginea</i>	<i>Toninia tumidula</i>
<i>Usnea articulata</i>	

A general remark is that in the Mediterranean lichen vegetation truly Mediterranean species are mostly saxicolous; the epiphytic vegetation is chiefly composed by broad-ranging, submediterranean or oceanic species, depending on the different ecological conditions.

- Widespread semi-desert lichens: this element includes a number of species that occur in the most arid parts of the Mediterranean region, as well as in other arid regions of the world, often also in cold-arid areas. Their habitats have always a semi-desert character, also when extending over small surfaces like clearings in garigue vegetation on south-exposed slopes. Among the species of this element we cite:

<i>Acarospora lavicola</i>	<i>Acarospora schleicheri</i>
<i>Buellia buellioides</i>	<i>Buellia epigaea</i>
<i>Caloplaca interfulgens</i>	<i>Diploschistes steppicus</i>
<i>Fulgensia desertorum</i>	<i>Gonohymenia nigritella</i>
<i>Lichinella stipatula</i>	<i>Psora albilabra</i>
<i>Psora decipiens</i>	<i>Parmelia mexicana</i>
<i>Parmelia taractica</i>	<i>Peltula obscurans</i>
<i>Peltula patellata</i>	<i>Peltula psammophila</i>
<i>Psora albilabra</i>	<i>Psora decipiens</i>
<i>Physcia strigosa</i>	<i>Squamaria lentigera</i>
<i>Toninia coeruleonigricans</i>	

- Maritime element: this element includes mainly saxicolous species that are confined to the coast, mostly in the salt-spray belt. Such lichens have been rather neglected in the Mediterranean region: among them there both species restricted to the Mediterranean coasts and widespread species:

Arthopyrenia sublitoralis	Caloplaca littorea
Caloplaca microthallina	Caloplaca ora
Caloplaca thallincola	Diploicia subcanescens
Dirina ceratoniae	Dirina massiliensis
Lecanactis grumulosa	Lecanora contractula s.lat.
Lecanora salina s.lat.	Ramalina arabum
Ramalina breviscula	Ramalina cribrosa
Roccella fuciformis	Roccella phycopsis
Roccella vicentina	

Probably other species should belong here; an example is *Lecanora poeltiana*, which until now has been always collected close to the coast.

- Oceanic-suboceanic element: the greatest part of the lichens assigned to this element, which is one of the best studied of the European lichen flora, consists of foliose or fruticose species which in Sardinia are most frequent in closed woods of the montane belt, in the fog-zone. Some species also occur along the coast where fog is frequent. The limits between this and the Mediterranean-montane element are not always very clear, since in both cases the species have high moisture requirements.

Collema fasciculare	Collema furfuraceum
Collema nigrescens	Collema subnigrescens
Dendroicocaulon umhausense	Dimerella lutea
Enterographa crassa	Leptogium brebissonii
Leptogium corniculatum	Leptogium cyanescens
Leptogium saturninum	Lobaria virens
Nephroma laevigatum	Nephroma tangeriense
Normandina pulchella	Pachyphiale cornea
Pannaria rubiginosa	Parmeliella plumbea
Parmotrema reticulatum	Ramalina roesleri
Teloschistes flavicans	

- Species of fog-deserts: under this heading we list just two fruticose lichens that occur in warm-arid sites with frequent fog; in the Mediterranean region they are rare and restricted to the coasts, mostly on shrubs growing on sand dunes:

Teloschistes villosus	Tornabea scutellifera
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- Western species: these species have a western distribution, at least in Europe, without being clearly restricted to sites with high air humidity.

They are treated here as belonging to the same element, which however, is clearly heterogeneous. Many of them tend to grow only near the coast in the northern part of their ranges, whereas further south they often occur also at higher elevations and rather far from the sea:

<i>Anaptychia runcinata</i>	<i>Anisomeridium biforme</i>
<i>Lecania atrynoides</i>	<i>Lecanora gangaleoides</i>
<i>Lecanora lisbonensis</i>	<i>Lecanora schistina</i>
<i>Lecidella scabra</i>	<i>Leptochidium albociliatum</i>
<i>Moelleropsis nebulosa</i>	<i>Ochrolechia subviridis</i>
<i>Opegrapha ochrocheila</i>	<i>Opegrapha venicellifera</i>
<i>Protoblastenia lusitanica</i>	<i>Pyrrhospora quærna</i>
<i>Ramalina clementeana</i>	<i>Ramalina lacera</i>
<i>Rinodina atrocinerea</i>	<i>Rinodina luridescens</i>
<i>Schismatomma decolorans</i>	<i>Solenopsora holophaea</i>
<i>Thelenella modesta</i>	<i>Trapeliopsis wallrothii</i>
<i>Toninia toepfferi</i>	<i>Umbilicaria grisea</i>
<i>Umbilicaria polyrrhiza</i>	

- Endemic species. The phanerogamic flora of Sardinia is rich in endemic species; their number is even much higher if Corsica and Sardinia, two areas with a very similar history of geographical isolation, are considered together. Among lichens, as it happens for most other cryptogams, species which are endemic of narrow areas are not frequent. However there are some lichen taxa, among them also some macrolichens, that are hitherto known only from Sardinia, or Sardinia and Corsica. Not considering the new taxa described in this paper, we may cite *Lasallia brigantium* s. str., *Ramalina cribrosa*, *Physcia scopulorum*; at least on the basis of the present knowledge these species should be considered as Corsardinian endemics. Whether this will apply also for the poorly known *Ochrolechia croazalsiana* and for other crustose species, this will be decided by future studies.

O r g a n i z a t i o n o f t h e b o o k

In the following list the taxa are ordered alphabetically. A list of the most important synonyms is provided in Appendix 1. In the text the localities are cited with a brief name; a more detailed specification of the collecting sites is given in Appendix 2. A map of the collecting sites is in Fig. 9. The localities are grouped according to administrative provinces, designated with different letters, as follows:

- C - Province of Cagliari
- N - Province of Nuoro
- O - Province of Oristano
- S - Province of Sassari.

When the collectors are not cited with their names, the following shortenings have been used:

Leg. B - H. Brunnbauer, Wien. Private Herb. Brunnbauer (HbWB), collections made prior to 1986. (1980,1983,1985).

Leg. E - Collections made during the excursion to Sardinia in May 1986. The collectors are designed by the quotation of their respective herbaria, as follows:

(GZU) - J. Poelt

(HbWB)- W. Brunnbauer

(TSB) - P.L. Nimis

(SZU) - R. Türk

Leg. M - Same as Leg. E, collections by H. Mayrhofer.

Leg.NP - Collections made during the excursion to Sardinia in July 1985 by P.L. Nimis, J. Poelt and L. Schiavon. Collectors are designed by the herbarium quotation, as follows:

(GZU) - Leg. J. Poelt

(TSB) - Leg. P.L. Nimis

Leg. W - Leg. H. Wunder, excursion to Sardinia, 4.1971. Private Herbarium of H. Wunder (Berchtesgaden, W-Germany).

Leg. WP- Leg. H. Wittmann & P.Pils, 1979,1980, specimens in the private herbarium of H. Wittmann (Salzburg, Austria) or in SZU.

Just before publication we managed to include in the catalogue samples collected in April 1987 by G. Brizzi on the island of Tavolara, and by M. Pertot in northern Sardinia, and a collection made by M. Tretiach in May 1987 in southwestern Sardinia; these collections are deposited in TSB.

All other herbarium quotations follow the Index Herbariorum. In the case of the specimens cited by BAGLIETTO (1879), and reported in our list, the specification "MOD" means that at least one of the authors has seen the specimen in the Herbarium of the Botanical Institute of the University of Modena. When this specification is lacking, the report of BAGLIETTO has been accepted without checking the original material on which it was based.

A c k n o w l e d g e m e n t s

The compilation of this list would have not been possible without the collaboration of several colleagues.

In particular, O. BREUSS wrote the parts relative to the genera Catapyrenium, Placocarpus and Placopyrenium, W. BRUNNBauer sent us a large list of lichens which he collected in Sardinia, revised samples of Bacidia and Mycobilimbia and provided the results of an extensive bibliographical research on the botanical exploration of the island, P. CLERC wrote the chapter of Usnea, J. HAFELLNER identified many lichenicolous fungi and carried out chemical analyses of Bryoria and Tephromela, H. HERTEL revised many samples of Lecidea s. lat., P.W. JAMES made a thorough revision of the English text, with critical notes on the manuscript (eventual faults in the

English are due to later additions, which have not been checked, like this chapter), H. MAYRHOFER is the author of the chapters concerning Rinodina and Rinodinella, M. MAYRHOFER of the chapter on Lecania, C. LEUCKERT carried out many chemical analyses, C. SCHEIDEGGER wrote the part concerning the saxicolous Buellia species and A. VEŽDA revised lichens belonging to different groups.

Furthermore, we wish to acknowledge our indebtedness to the many other colleagues who helped us in the preparation of this catalogue with the identification of critical specimens, the loan of type material or of collections from Sardinia, the fruitful criticism. They are:

T. AHTI (Helsinki)	P.V. ARRIGONI (Firenze)
D. BERTOLANI-MARCHETTI (Modena)	G. BRIZZI (Trieste)
I. BRODO (Ottawa)	I. CAMARDA (Sassari)
M. CODOGNO (Cosenza)	H. SCHIMAN-CZEKA (Wien)
G. DEGELIUS (Göteborg)	B. FEIGE (Essen)
T. FEUERER (Hamburg)	C. FOGU (Cagliari)
G. GOTH (Wien)	E. JAEGER (Halle)
P.M. JOERGENSEN (Bergen)	D.L. HAWKSWORTH (London)
H. KILIAS (Bayreuth)	H. KROG (Oslo)
R. MOBERG (Uppsala)	C. MOSSA (Cagliari)
T. NASH (Tempe)	E. PIGNATTI (Trieste)
M. PERTOT (Trieste)	P. PILSL (Salzburg)
C. ROUX (Marseille)	L. SCHIAVON (Trieste)
L. TIBELL (Uppsala)	M. TRETIACH (Trieste)
T. TÜRK (Salzburg)	H. ULLRICH (Goslar)
H. VÄNSKÄ (Helsinki)	O. VITIKAINEN (Helsinki)
H. WITTMANN (Salzburg)	H. WUNDER (Berchtesgaden)

Part of the field-work and the publication of this list have been financed by the University of Trieste (Funds for International Cooperation), and by two M.P.I. grants (60 % and 40 %) to P.L. Nimis.

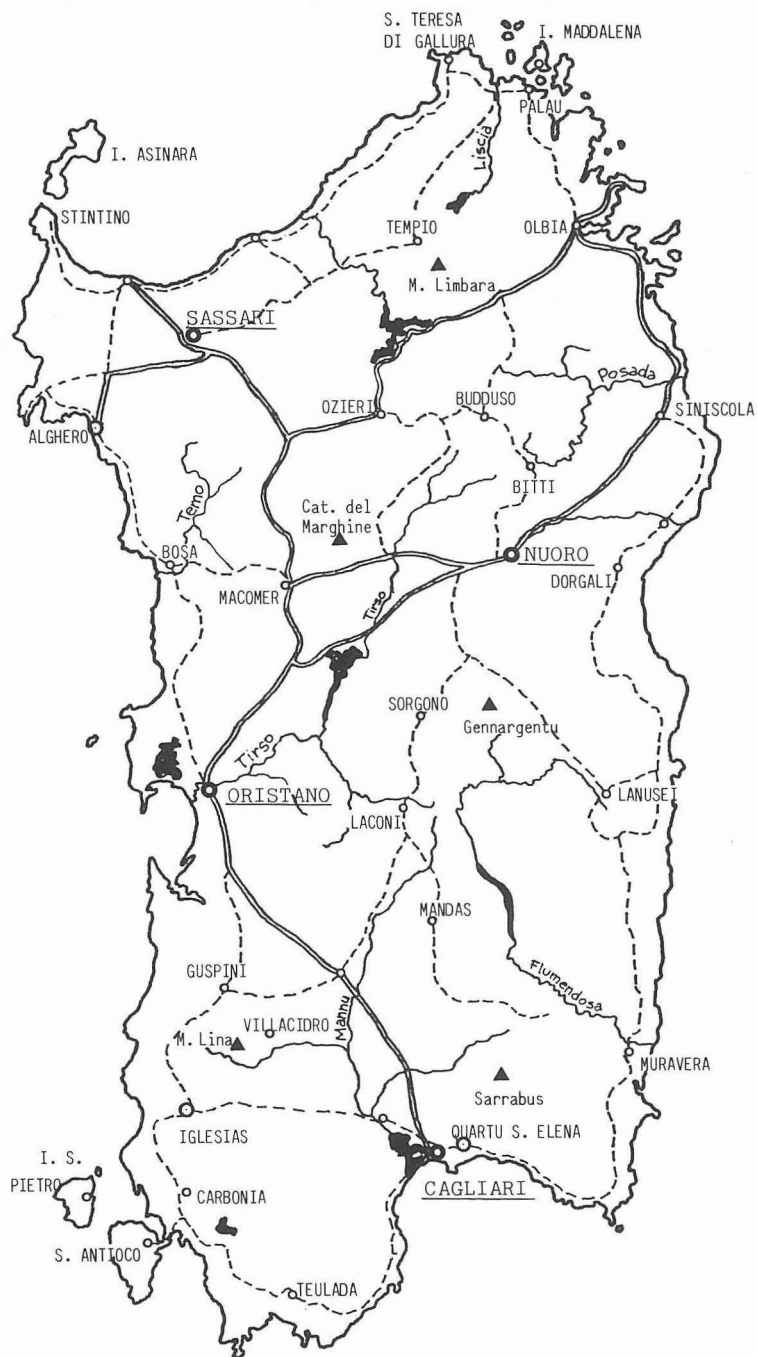


Fig. 8 - Schematic map of Sardinia.

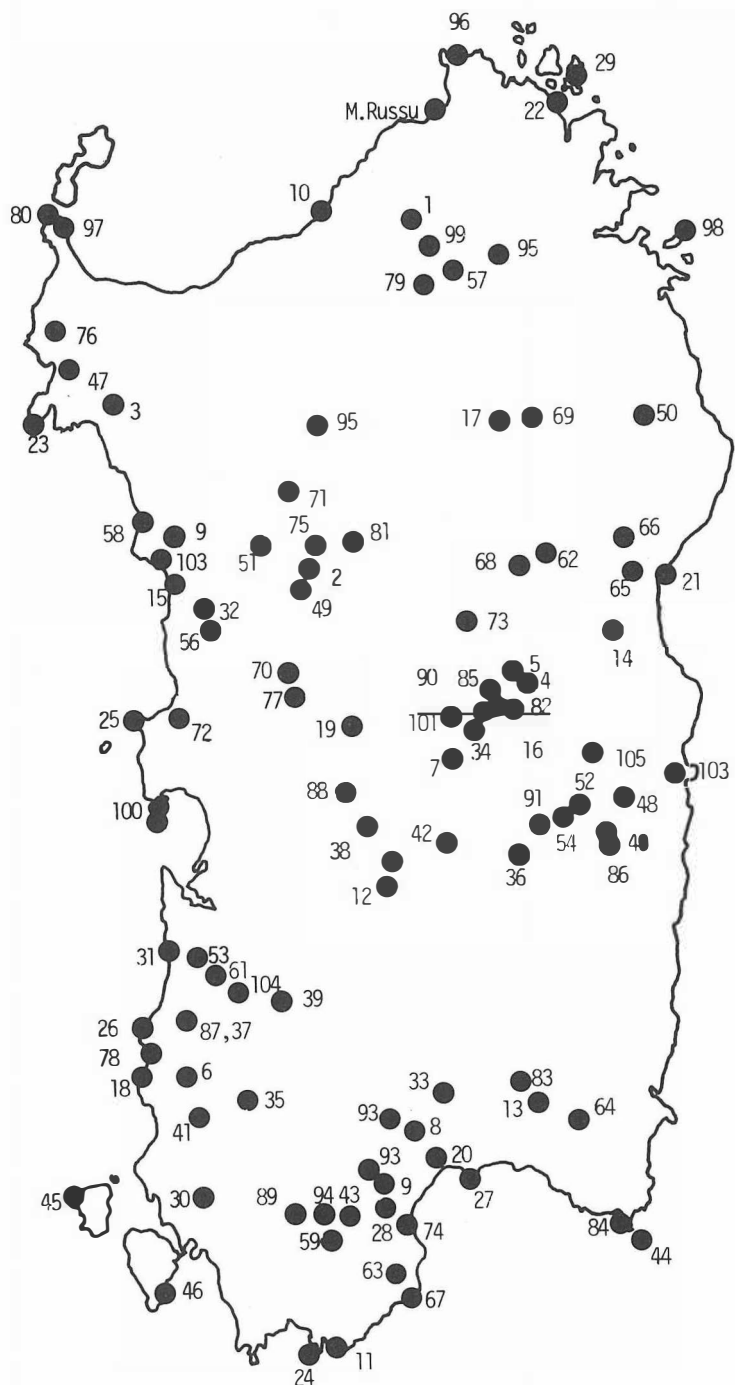


Fig. 9 - Main collecting sites cited in the text. The localities are numbered as in Appendix 2.

1 *Acarospora*

This difficult genus is still insufficiently studied in Sardinia, as in most other parts of the world. On the island sterile populations of *Acarospora* have been frequently collected which cannot be identified. In our listing we mostly follow MAGNUSSON (1929,1936), however, we have also found the keys of CLAUZADE & ROUX (1981) very useful, but we have not followed the latter work in accepting the many subordinate taxa treated as species by earlier workers. Besides the species cited below, there is also a citation of *Acarospora peliscypha* Th. Fr. from Busachi (Oristano) by MAMELI 1920: 168); we could not check the original specimen of this doubtful record.

1 *A. badiofusca* (Nyl.) Th. Fr.

N - Bruncu Spina, 1700-1800 m. Leg. NP (GZU,TSB).

The occurrence of this more or less arctic-alpine species (distribution map in MAGNUSSON 1929:292) is not surprising. It is associated with several other species with a similar pattern of distribution.

2 *A. cervina* Massal.

N - M. Arcueri, on limestone. Leg. E (GZU,TSB).

Acarospora cervina has a wide distribution in the southern part of the temperate zone, north and south of the Mediterranean sea and to the east far into Asia (MAGNUSSON 1929: 245,398). It is a calcicole and nitrophytic lichen occurring on boulders or walls near roads, tops of rocks, etc. (OZENDA & CLAUZADE 1970:504; BUSCHARDT 1979:44).

3 *A. fuscata* (Nyl.) Arnold

N - S' Arcu de Tascussi. Leg. NP (TSB).

This species has also been observed in other localities in the higher areas of the island intermixed with several other crustose lichens; it is probably not rare in Sardinia.

4 *A. glaucocarpa* (Ach.) Koerb.

N - Isili, on schist. (COLOSI 1917:468).

We could not check the identification of COLOSI. The presence of *Acarospora glaucocarpa* in Sardinia is probable.

5 *A. hilaris* (Duf.) Hue

C - S. Lucia, on south-facing steep siliceous rocks. Leg. NP (GZU,TSB).

This species is widespread in the Mediterranean region on sunny,

steeply inclined, very hard rocks (limestone-free silicates) which often assume a greenish colour, as a result of being entirely covered by this lichen. For the ecology and distribution of this species in the Iberian Peninsula see CRESPO et al. 1976. Another locality where this species has been observed but not collected was along the road from Arbus to Buggerru, on nearly vertical rock faces. We have searched in vain for the usually frequent parasite *A. epithallina* H. Magn.

6 ***A. hospitans*** H. Magn.

C - P.ta Serpeddi', on *Aspicilia*. Leg. NP (GZU).

The circumscription of this taxon is not clear, so that the identification is not certain.

7 ***A. insolata*** (B. de Lesd.) Redgr.

N - Rio Pardu. Leg. E (GZU).

This species is parasitic on the thalli of other crustose lichens.

8 ***A. kordofanica*** Zahlbr. ex H. Magn.

C - M. Orri. Leg. Canepa. (MAGNUSSON 1929:54). - P.to S. Stefano, on the side walls of a macrocrystalline, strongly weathered siliceous boulder. Leg. NP (GZU,TSB).

We have not seen the type, but our material corresponds well with the description of MAGNUSSON 1929; the species very much resembles *A. microcarpa*, which, however, is parasitic on *Diploschistes* spp.; we did not observe any host in our material. The species was described from Africa (Sudan).

9 ***A. lavicola*** J. Steiner

C - M. Arcuentu, on basaltic rock. Leg. E (HbWB, GZU,TSB).

N - Torre Argentina, on lava, rare. Leg. NP (GZU).

A. massiliensis (Harm.) H. Magn., as demonstrated by STEINER & POELT 1984: 563-565, is identical to *A. lavicola*. The distribution of this species, which is more or less restricted to igneous rocks, is very scattered (distribution map in STEINER & POELT 1984: 562).

10 ***A. marcii*** H. Magn.

N - Arcu Correboi. Leg. E (HbWB, GZU).

This species is included under *A. peliscypha* by CLAUZADE & ROUX 1985: 135; in our opinion, the two taxa are distinct.

11 ***A. microcarpa*** (Nyl.) Wedd.

C - Giara di Gesturi, on *Diploschistes actinostomus*. Leg. NP (GZU,TSB). - Capo Pecora, on *Diploschistes euganeus*. Leg. E (HbWB,

GZU,TSB), M.

N - Torre Argentina. Leg. NP (GZU,TSB).

In all stations this species occurred on weathered, coarse-textured rocks, and was parasitic on *Diploschistes* spp. Occasionally, thalli of *Acarospora* are found adjacent to the thalli of *Diploschistes*, but the species never occurs without its host. This species is widely distributed e.g. in the dry regions of southeastern Spain (see EGEA & LLIMONA 1983 fig.8). See also note to *A. kordofanica*.

12 *A. modenensis* H. Magn.

C - Capo Pecora. Leg. E (GZU), rev. C. Roux.

N - Torre Argentina. Leg. NP (GZU).

This species was described from the town of Modena in Northern Italy. Its distribution is poorly known.

13 *A. oxytona* (Ach.) Massal.

C - Ad basaltas in cacuminibus Flumini-Bina supra Orri. Leg. Canepa. (MOD, BAGLIETTO, 1879:72)

N - Arcu Correboi, 1246 m. Leg. B. - *ibid.*, Leg. E (GZU,TSB), M (GZU).

A montane species in the northern hemisphere, ranging from Macaronesia to France, the Alps, Caucasus and Iran, to the Baikal Sea. Its full range includes North America. In one of the three collections of Arcu Correboi some of the oldest apothecia are strongly convex.

14 *A. schleicheri* (Ach.) Massal.

C - Promontorio S. Elia, and without locality. (BAGLIETTO 1879: 72, and MAGNUSSON 1929:79, W).

This is a widespread xerophytic soil lichen, which, according to our observation commences its early formation as a parasite. Known from many stations in the Mediterranean region and Macaronesia and extending eastwards to the steppes of central Asia. Its full range also includes North America. Distribution map in MAGNUSSON 1929, no. 9.

15 *A. scotica* Hue

N - Torre Argentina, on lava. Leg. NP (GZU).

The identification is not completely certain, although our material complies with the description of MAGNUSSON 1929: 224. The species was described from the Mediterranean area of southern France, and is also known from Corsica (WERNER 1973:322), northern Italy and southeastern Spain (EGEA & LLIMONA 1983 fig.6). In our station, it grew with *A. versicolor* and another, sterile, *Acarospora*.

16 **A. smaragdula** (Wahlenb. ex Ach.) Massal.

C - P.ta Serpeddi'. Leg. NP (TSB,GZU).

N - Rio Aratu. NP. (GZU). - Isili, on schist (COLOSI 1917:469).

S - M. Limbara. Leg. E (GZU).

This is a circumpolar species with temperate to arctic distribution, with scattered outliers in the mountains of central and southern Europe (MAGNUSSON 1929:157). Three further localities are cited in BAGLIETTO 1879: 72, i.e. S. Barbara (Capoterra, CA) , Lanusei and M. Cepera (Guspini). We have not checked the original collections.

17 **A. sphaerospora** H. Magn.

N - Rio Pardu, on Aspicilia. Leg. E (GZU).

This lichen was parasitic on Aspicilia cupreoglaucula, which was also infected by Endococcus rugulosus. The specimen corresponds well to the description by MAGNUSSON 1929: 256. The cortex is C+ red, the spores are globose or subglobose, measuring ca. $3.5-4.2 \times 3-3.5 \mu\text{m}$. The species was known only from the holotype (France, Aveyron, Calvados) and from some collections in southeastern Spain (EGEA & LLIMONA 1983 fig.9).

18 **A. subrufula** (Nyl.) Oliv.

C - Capo Pecora. Leg. E (GZU).

The collection accords well with the original description.

19 **A. umbilicata** Bagl.

C - Cagliari. (MAGNUSSON 1929:316). - M. Arcuentu, on basaltic rock.

Leg. E (HbWB).

A south-european species, extending northwards to South Norway.

20 **A. versicolor** Bagl. et Car.

N - Torre Argentina, on lava. Leg. NP (GZU).

The specimen was collected with the previous species. The distribution of this species extends from northern to southern Europe (MAGNUSSON 1929:204).

2 Acrocordia

1 **A. cavata** (Ach.) Ach.

N - M. Arcueri, on Quercus ilex. Leg. E (GZU).

This often misunderstood species seems to be widely distributed in subatlantic Europe. It differs from Acrocordia gemmata by having smaller perithecia and spores.

2 **A. conoidea** (Fr.) Koerb.

N - M. Albo, North exposed subvertical limestone wall. Leg. NP (GZU, TSB). - Iacco di Seui. Leg. Marcucci. (MOD. BAGLIETTO 1879: 114) - M. Arcueri. Leg. E (TSB), M.

The specimens all belong to the var. **conoidea**.

A widespread species on shaded limestone rocks. In Sardinia it is probably frequent in limestone areas, especially in the mountains.

3 **A. gemmata** (Ach.) Massal.

N - M. Arbo, on Quercus. Leg. E (TSB).

4 **A. macrospora** Massal.

C - M. Sette Fratelli, on rock. Leg. Gennari (MOD. BAGLIETTO 1879: 114). Differs from *A. conoidea* having larger spores and perithecia with an uneven involucrellum; its ecology is also different since it mostly grows on non-calcareous rocks. The specimen well fits the original description by MASSALONGO. Duplicates from the same locality have been distributed in Erb. Critt. Ital. I.393.

3 **A g o n i m i a**

1 **A. tristicula** (Nyl.) Zahlbr.

Syn.: *Polyblastia tristicula* Nyl.

N - M. Albo, over mosses on calcareous soil. Leg. NP (GZU, TSB). -

P.ta Palai, on mosses. Leg. NP (GZU). - M. Arcueri. Leg. E (GZU, TSB).

This, a widespread species growing on epigeaeic mosses on calcareous substrates, becomes progressively rarer eastwards. Some of the collections are sterile; in these cases identification is not completely certain.

4 **A n a p t y c h i a**

1 **A. ciliaris** (L.) Koerb.

C - M. Santo di Pula. Leg. Canepa (MOD). - M. Sette Fratelli, 500 m. Leg. WP. - Capoterra. Leg. Canepa (MOD). - Isola dei Cavoli, on acid rock. Leg. NP (TSB, GZU). - Giara di Gesturi, on Quercus suber. Leg. NP, W (TSB, GZU). - Capo Sandalo. Leg. Feige. - S. Pantaleo. Leg. Tretiach (TSB). - Orri, on Ailanthus. Leg. Canepa (MOD).

N - Rio Aratu. Leg. W. - S' Arcu de Tascussi, on Alnus. Leg. NP (TSB). - Macomer, on basaltic rock. Leg. Marcucci (MOD). - P.ta Palai. Leg. B. - ibid. Leg. Pertot (TSB). - Arcu Correboi. Leg. B,

E (SZU). - M. Arbo. Leg. E (SZU,TSB), M. - M. Albo, on limestone. Leg. NP (TSB). - Tonara, Isili. (COLOSI 1917: 465).

O - M. Ferru. Leg. Feige.

S - Altopiano di Campeda, 650 m. Leg. B. - P.ta Falcone. Leg. Feige. A widespread species ranging from North Africa (and Macaronesia) to south Scandinavia. In Sardinia it is common from sea level to the heights of the Gennargentu Massive. In mountain stations it is frequently also epilithic. All of the specimens in MOD have been cited by BAGLIETTO 1879: 60-61, some of them under the varietal name *crinalis* (Schl.) Bagl. With a single exception, the latter do not belong to *A. crinalis* but are just narrow-lobed forms of *A. ciliaris*.

2 *A. crinalis* (Schleich. in Schrad.) Veřda

C - M. Sette Fratelli. Leg. Canepa (MOD, BAGLIETTO 1979: 61)

The specimen has apothecia with clearly spinulose thalline margins. See also *A. ciliaris*.

3 *A. runcinata* (With.) Laund.

Syn.: *Anaptychia fusca* (Huds.) Vain.

C - P.ta Serpeddi', on acid rocks. Leg. NP (GZU,TSB). - M. Santo di Pula. Leg. Gennari (MOD). - M. Sette Fratelli. Leg. Gennari (MOD). - Villacidro, 270-370 m. Leg. WP. - Sinnai, epiphytic. COLOSI 1917: 465, as *Anaptychia aquila*.

N - P.ta Palai, on rock. Leg. NP (TSB). - M. Ortobene, on granite. Leg. NP (TSB). - Bosa, 5-65 m. Leg. B. - Arcu Correboi. Leg. E (GZU,TSB) - Rio Pardu. Leg. E (GZU). - Between Dorgali ad Tortoli, 900 m. Leg. WP. - Lanusei. Leg. Canepa (MOD). - Macomer. Leg. Canepa (MOD). - Orani, on moss, herb. Garovaglio (MAMELI 1920:163, as *Anaptychia aquila*).

O - Nuraghe Losa. Leg. Feige.

S - Aggius, 580 m. Leg. WP. - M. della Neula, 350-415 m. Leg. B. - M. Russu, on granite close to the coast. Leg. E (TSB). - Capo Orso, on granite. Leg. E (TSB), M. - M. Limbara, on granite. Leg. E (TSB). - P.so La Variante. Leg. E (SZU).

An epilithic (rarely epiphytic) species confined to western Europe, from north Norway and the Baltic, to France, Spain and Portugal. According to SEAWARD & HITCH (1982: 5) *Anaptychia runcinata* is a xeric-supralittoral to terrestrial-halophilic species. In Sardinia most of the localities are in the mountains, sometimes some way from the coasts. The collections in MOD are cited by BAGLIETTO 1879: 62, as *Hagenia aquila* (Ach.) De Not.

5 *Anema*

- 1 *A. decipiens* (Massal.) Forss.
C - Capo Caccia. Leg. Pertot (TSB).
- 2 *A. numularium* (Duf.) Nyl.
C - M. Arcuentu. Leg. E (GZU). Det. H. Schiman-Czeika.
N - M. Mannu, on west-facing steep calcareous rocks. Leg. NP (GZU,TSB).

6 *Anisomeridium*

- 1 *A. biforme* (Borr.) R.C. Harris
N - M. Arbo. Leg. E (TSB).

7 *Arthonia*

Probably several species of this genus have been overlooked on the island.

- 1 *A. clemens* (Tul.) Th.Fr.
C - Buggerru, parasitic on *Lecanora* sp. Leg. E (GZU). - "Super apothecia *Placodii saxatilis* et *albescantis* juxta Orri et Cagliari (Canepa)". BAGLIETTO 1879:121, as *Conida clemens* (Tulas.) Massal.
According to HAWKSWORTH 1983: 21, this is a widespread species, which is parasitic in the apothecia of different *Lecanoras*. We did not check the specimen cited by BAGLIETTO, but considering the hosts (*Lecanora muralis* and *Lecanora albescens*), it is probably *Arthonia clemens*.
- 2 *A. exilis* (Ach.) Almq.
C - Portixeddu, on *Acacia* sp. on sand dunes. Leg. E (HbWB). - *ibid.*
on *Pinus*. Leg. E (GZU).
N - M. Ortobene, on *Pinus*. Leg. NP (TSB).
S - Badesi Mare, on *Juniperus*. Leg. E (GZU,TSB).
- 3 *A. galactites* (DC.) Duf.
C - Cagliari, surroundings, on *Morus*. Leg. Gennari (MOD. BAGLIETTO 1879: 110).
- 4 *A. glaucmaria* (Nyl.) Nyl.
C - P.ta Serpeddi', on *Lecanora rupicola*. Leg. NP (GZU). - Giara di Gesturi, on *Lecanora sulphurata*. Leg. W. - P.to S. Stefano, on

Lecanora rupicola. Leg. NP (GZU). - M. Arcuentu, on *Lecanora sulphurata*. Leg. M. - "In apotheciis *Lecanorae* flavescentis haud rarum circum Orri (Canepa)". BAGLIETTO 1879:121 as *Celidium* varians (Dav.): the host is *Lecanora sulphurata* (MOD).

N - Arcu Correboi, on *Lecanora bicincta* and *L. sulphurata*. Leg. E (GZU), M. - M. Arcueri, on *Lecanora rupicola*. Leg. M.

S - M. Limbara, on *Lecanora rupicola*. Leg. M.

This easily recognizable lichenicolous fungus seems to be widely distributed and common in Sardinia. It grows on epilithic *Lecanoras* of the *rupicola*-group; it is absent on related corticolous species such as *Lecanora carpineae*. The species has been also observed in many other localities, besides those listed.

5 *A. intexta* Almq.

C - P.ta Serpeddi', in *Lecidella vorax*. Leg. NP (GZU).

N - M. Mannu, in *Lecidella carpathica* s.l. Leg. NP (GZU). - P.ta Palai, inside the apothecia of *Lecidella carpathica*. Leg. B. - M. Arcueri, in *Lecidella carpathica*. Leg. E (GZU).

This interesting lichenicolous fungus develops asci inside the hymenia of *Lecidella* spp. (HERTEL 1969).

6 *A. impolita* (Ehrh.) Borr.

N - Tortoli, on *Ficus carica*. Leg. Marcucci. (MOD. BAGLIETTO 1879: 110).

A southern and western species in Europe, with isolated outliers northwards to Scotland, also reported from North Africa.

7 *A. lapidicola* (Th.Tayl.) Zahlbr.

N - M. Albo, on limestone. Leg. NP (GZU,TSB).

8 *A. radiata* (Pers.) Ach.

N - Lanusei, on *Castanea*. Leg. Marcucci (MOD, BAGLIETTO 1979: 109-110, sub *A. astroidea* Ach.).

A central European species which in the Mediterranean region mainly occurs in the montane vegetation belt.

9 *A. sp.*

N - Rio Aratu, parasitic on *Diploicia canescens*. Leg. NP (GZU).

10 *A. sp.*

N - Arcu Correboi, parasitic on *Acarospora oxytona*. Leg. E (GZU).

8 *Arthopyrenia*

In addition to the species cited below, MAMELI 1920:171 also records *Arthopyrenia analepta* (Ach.) Massal. from Busachi (Oristano) on *Prunus cerasus*; the same species, with the var. *lentisci* Bagl. is cited by COLOSI 1917: 470 from Cagliari; we have not checked these records.

1 *A. cerasi* (Schröd.) Massal.

N - Seui, on *Prunus cerasus*. Leg. Marcucci. (MOD. BAGLIETTO 1879:116).

2 *A. cinereopruinosa* (Schaer.) Massal.

N - Rio Aratu, on *Prunus*. Leg. NP (TSB).

3 *A. punctiformis* Massal s.l.

C - Giara di Gesturi, on *Quercus suber*. Leg. NP (GZU).

N - Rio Aratu. Leg. NP (GZU, TSB).

4 *A. cf. strontianensis* Swinscow

N - Rio Aratu, with *Verrucaria anziana* in a brook. Leg. NP (GZU).

Our scarce material corresponds to the description of SWINSCOW (1967), but the ascocarps have only 0.1-0.2 mm in diameter. Exciple dark brown, at the base somewhat paler. Paraphyses anastomosing. Spores 18-21 x 8-9 μ m. The perithecia are sessile on a blackish thallus, which is possibly the thallus of the lichen.

5 *A. sublitoralis* (Leight.) Arnold

N - Torre Argentina, on barnacles (genus *Chthamalus*, det. R. Schuster, Graz) along the coast. Leg. NP (GZU).

? - "Sardinien, on *Patella ferruginea* (Bz, Sz)" in SANTESSON 1939: 60. A strictly litoral lichen that grows on limestone and on the shells of many molluscs and arthropods on the coasts. It has a worldwide distribution. Nomenclature follows SANTESSON 1984:33.

9 *Arthothelium*

1 *A. sardoum* Bagl.

C - "Ad corticem *Phyllireae Latifoliae* et *Oleastri* in sylvis circum Capoterra (Canepa)". (BAGLIETTO 1879: 109).

There is no material annotated as *Arthothelium sardoum* in MOD; however, a collection named as *Mycoporum*, and with an analysis of the spores, is possibly type material of *Arthothelium sardoum*. Measurements of the

spores are reported on the label and are: 19-27 x 8-12 μm ; the drawings show one of the cells with a longitudinal septum. Unfortunately, this material has been completely destroyed by invertebrates.

10 *Aspicilia*

Many collections of this notoriously difficult genus have not been identified, especially those of silicicolous forms of *Aspicilia contorta* s. lat., which seem to be rather common on the island. For the systematics of *Aspicilia* see CLAUZADE & ROUX 1984 and ESNAULT (1985).

1 *A. alphoplaca* (Wahlenb. apud Ach.) Poelt et Leuckert

Syn.: *Lecanora alphoplaca* Ach.

N - Bruncu Spina, on acid rock. Leg. NP (GZU, TSB). - "In monte Gennargentu (Genn.)" (BAGLIETTO 1879, as *Placodium inflatum alphoplacum*).

A species with an irregular distribution from the Arctic and north Scandinavia to the mountains of central and southern Europe, where it mostly occurs on more or less basic siliceous rocks (POELT 1964:257; 1969: 345). It shows a preference for slightly inclined surfaces in the southern parts of its range (BUSCHARDT 1979: 68). Also known from North America and Greenland (WEITMORE 1967: 384).

2 *A. aquatica* Koerb.

N - P.ta Palai, river bottom. Leg. NP (GZU, TSB). - Rio Pardu. Leg. E (GZU).

This species, which grows in creeks, is often subjected to dry periods during summer in the Mediterranean region, as, for example, in both of the cited localities.

3 *A. caesiocinerea* (Nyl.) Arnold

S - Capo d' Orso, with *Buellia badia*. Leg. E (GZU).

The specimens certainly belong to *Aspicilia caesiocinerea*, at least in the broad sense.

4 *A. calcarea* (L.) Mudd var. *calcarea*

C - Cagliari, on limestone. Leg. Canepa (MOD. BAGLIETTO 1879: 87). - Buggerru. Leg. E (TSB).

N - M. Albo, on sun-exposed calcareous rocks. Leg. NP (TSB). - M. Arcueri. Leg. E (GZU, TSB). - Esterzili, with *Collema cristatum*. Leg. E (GZU), M.

This species seems to be common on calcareous substrata on the island.

The distribution of var. *calcareea* is poorly known. Many specimens named *Aspicilia calcarea* from central Europe are *Aspicilia contorta*.

5 **A. calcarea** (L.) Mudd var. **reagens** (Zahlbr.) Szat.

N - M. Albo. Leg. NP (GZU).

This chemical variety seems to be confined to the Mediterranean area.

6 **A. cinerea** (L.) Koerb.

N - Arcu Correboi. Leg. E (GZU, TSB).

O - Busachi, on sandstone. (MAMELI 1920: 168).

This rather nitrophilous lichen with a wide ecological amplitude is probably not taxonomically homogeneous. The "species" should be considered as an aggregate concealing other, more narrowly defined taxa.

7 **A. contorta** (Hoffm.) Krempelh.

C - Cagliari, surroundings. Leg. Canepa (MOD. BAGLIETTO 1879: 87, as *Aspicilia calcarea* b) *contorta*). - M. Arcuentu. Leg. M.

N - Arcu Correboi. Leg. M, det. C. Roux. - M. Arcueri, on limestone. Leg. E (TSB).

S - Tavolara. Leg. Brizzi (TSB).

Aspicilia contorta is a rather nitrophilous species common throughout Italy from the lowland to the montane vegetation belt (in the South); it often occurs on artificial substrates or small pebbles. Probably the same species grows also on different types of siliceous rock, where it is rather common.

8 **A. coronata** (Massal.) B. de Lesd.

N - M. Albo, on limestone. Leg. NP (GZU).

The taxonomy of this species is not completely clear (see CLAUZADE & ROUX 1985 : 181). In our opinion, endolithic forms of the *Aspicilia calcarea*-group occur in the Mediterranean region and in the alpine belt of the Alps, where they are rare. These remain to be studied, to ascertain whether they should be retained in a single taxon.

9 **A. cupreoglauc**a B. de Lesd.

Syn.: *Aspicilia cinerea* g) *rubicunda* Bagl. 1879:86; *Lecanora cinerea* var. *rubicunda* (Bagl.) Zahlbr. Cat. Lich. Un. 5: 287, 1928.

C - P.ta Serpeddi'. Leg. NP (GZU, TSB).

N - Rio Pardu, on schists. Leg. E (GZU). - Seui. Leg. Marcucci. BAGLIETTO 189: 86 as *Aspicilia cinerea* g) *rubicunda*.

This characteristic species is close to *Aspicilia epiglypta* (Norrl.) Hue. According to CLAUZADE 1969 it seems to be widespread in

Mediterranean France, including Corsica, on siliceous exposed rock outcrops. The description of var. *rubicunda* given by BAGLIETTO loc.cit. corresponds well to *Aspicilia cupreoglaucula*. One of the specimens from MOD fits the description. Since not all specimens of *Aspicilia cinerea* cited by BAGLIETTO have been revised, the typification will be left to a future paper.

10 *A. farinosa* (Nyl.) Arnold

N - M. Albo, on limestone. Leg. NP (GZU). - Orani, from the herb. Garovaglio (MAMELI 1920:167).

S - Isola di Caprera (JATTA, Lich. infer. It., Manip. II, 223).

11 *A. glomerulans* (Poelt) Poelt

N - Arcu Correboi. Leg. E (GZU).

This species, described from the central Alps is characterized by the contorted and partly flattened, isidia-like outgrowths of the thallus. More material should be collected to obtain a clearer picture of the taxon (see also POELT 1961:177, as *Lecanora glomerulans*).

12 *A. hydrocharis* Poelt et Nimis spec. nov.

Typus: Sardinia, Prov. Nuoro. Catena del Marghine, infra Punta Palai, in saxo rivi aestate sicci, ca. 920 m 24.7.1985. Leg. P.L.Nimis et J. Poelt (GZU; isotypus TSB).

Species hydrophila. Thallus late expansus, comparate crassus, + plumbei-griseus, ad margines distincte lobatus, lobis acute lati- atque longitudinaliter diffractis, applanatis. Thallus in centro areolatus, areolis angulatis marginibus acutis. Apothecia plerumque immersa in areolis non raro aliquantulum incrassatis, singula ad compluria. Disci atri, rotundati ad irregulares, marginibus atris saepe indistinctis interdum circumdati. Structura thalli paraplectenchymatica. Stratum algarum valde irregulare. Parathecii pars exterior paraplectenchymatica. Hypothecium cellulis parvis rotundatis distinctis compositum. Hymenium ± 100 um altum. Paraphyses ± submoniliformes. Sporae octonae vel pauciores, comparate parvae, ovaes. Spermatia bacillaria, recta. Epihymenium ac stratum superficiale thalli violacei-fusculum, K+ fuscipurpureum. Thellus K-, J-, non coerulescens.

On hard, periodically inundated, siliceous rocks. Thallus large, lead-grey to bluish gray, flat but thick, distinctly effigured at the margins, with often longitudinally fissured and then divided lobes (2-4 mm x 1.0-1.5 mm), with sharp margins. Inner parts areolate, areoles more or less polygonal, with sharp edges. Apothecia single or several in one areole, completely immerse or more rarely with indistinct to distinct exciple, 0.5-1.0 mm diam, black; apothecia-bearing areoles not

rarely somewhat thicker than sterile ones.

Thallus with paraplectenchymatic structure. Algal layer very irregular. Algae comparatively small. Parathecium paraplectenchymatic in the outer part. Hypothecium composed by roundish, small but distinct cells. Hymenium + 100 μm high. Paraphyses at least in the upper part submoniliform. Spores to 8 or fewer, mostly oval, about 10.0–12.5 x 5–8 μm . Spermatogonia immersed. Spermatia bacilliform, straight, about 5–10 x 0.7 μm . Medulla K–, J–. Epihymenium and outermost layer of the thallus brownish violaceous, K+ distinctly brownish red.

At least one collection of *Aspicilia hydrocharis* was growing over *Verrucaria anziana*; it was also associated with *Caloplaca atroflava* var. *submersa* and it was infected by *Muellerella pygmaea*. This new species is evidently allied to *Aspicilia aquatica*, which was growing in the same locality, but it has a much thicker, and distinctly lobate thallus. Because of the presence of lobes, it should be formally included in *Aspicilia* subgen. *Lobothallia* Clauzade et Roux (see also ESNAULT 1985:105), but it is probably not closely related to the other species of this group. It corresponds somewhat also to the poorly known *Aspicilia squamulata* Hue, but it differs from this species by the absence of norstictic acid, the much smaller spores etc. The method of lobe development, either primary, by ramification, or secondary, by longitudinal cracking, needs to be studied more intensively in this group.

13 *A. inornata* Arnold

N – Arcu Correboi. Leg. M , det. C. Roux.

14 *A. intermutans* (Nyl.) Arnold

C – P.ta Serpeddi'. Leg. NP (GZU).

15 *A. microspora* (Zahlbr.) Hue

N – M. Albo, parasitic on *Aspicilia calcarea*. Leg. NP (GZU).

16 *A. radiosa* (Hoffm.) Schaer.

C – M. Arcuentu. Leg. E (GZU,TSB). – "Ad rupes calcareas in Valle Canonica prope Iglesias (Canepa)" (BAGLIETTO 1879:69).

N – Between Cala Gonone and Dorgali. Leg.W. – M. Albo. Leg. NP (TSB). – Supramonte di Oliena. Leg. W.– Esterzili. Leg. E (HbWB), M. – M. Arcueri. Leg. E (GZU,TSB). – Seui. Leg. M. – Arcu Correboi. Leg. E (HbWB,TSB), M. – Orani, ex herb. Garovaglio (MAMELI 1920:165, as *Lecanora circinata*).

O – Nuraghe Tradori. Leg. W.

S – Nuraghe S. Antine. Leg. E (GZU). – Isola di Caprera. Leg.

Pedicino (JATTA, Lich. It. infer., I:36, as *Placodium radiosum*). A widespread species, common also in Sardinia on rather nutrient-enriched, slightly inclined rock surfaces. (POELT 1969:346). The species is very polymorphic and the group awaits a critical revision (HERMANN, LEUCKERT & POELT 1973: 22-23). In the nomenclature, we follow SANTESSON 1984: 44.

17 A. *simensis* Raes.

N - Rio Aratu. Leg. NP (GZU).

As this greenish grey, isidiate-blastidiate lichen described from Finland is comparatively frequent in central Europe, its occurrence in Sardinia is not surprising. The species seems to have a wide distribution, but it is not well known.

18 A. *verrucosa* (Ach.) Koerb.

Syn.: *Pachyospora verrucosa* (Ach.) Massal.

N - M. Arcueri, on mosses over limestone on a south-facing slope.
Leg. E (GZU, TSB).

11 B a c i d i a

partly by W. BRUNNBAUER

Only a few taxa belonging to this species-rich genus are reported from Sardinia. We consider *Mycobilimbia* Rehm (= *Bilimbia* De Not.) as an independent genus; the species in *Mycobilimbia* were formerly considered as belonging to *Bacidia*, but they clearly differ in their ascus structure (HAFELLNER 1984). Also with the exclusion of *Mycobilimbia*, *Bacidia* is probably not a homogeneous taxon.

1 B. *bagliettoana* (Massal. et De Not.) Jatta

Syn.: *Bacidia muscorum* (Ach.) Mudd

N - M. Albo, on epilithic mosses over calcareous rocks. Leg. NP (TSB). - Arcu Correboi, on mosses and soil. Leg. B. - M. Limbara, on moss over granite. Leg. E (TSB).

This species occurs from northern to southern Europe, being locally common in limestone areas; in southern Europe it is most frequent in the mountains.

2 B. *beckhausii* Koerb.

N - P.ta Palai, on Acer. Leg. NP (GZU), det. A. Vežda.

3 **B. cf. fallax** (Koerb.) Lett.

N - Between Cala Gonone and Dorgali. Leg. B.

S - Badesi Mare, on Juniperus. Leg. E (TSB).

The identity of these collections is not yet clear. The specimens belong to stirps that are closely related to *Bacidia rubella* (cf. *B. fallax*, *B. polychroa*), and probably have a south-european pattern of distribution: they are known from Corsica, Castelporziano near Rome and Creta. A revision of the whole group will be presented in a forthcoming paper.

4 **B. inundata** (Fr.) Koerb.

N - "In rupibus circum Seui". Leg. Marcucci. (BAGLIETTO 1879:107).

We have not seen the specimen. *Bacidia inundata* is a rather rare species whose presence in Sardinia, however, is a possibility.

5 **B. naegelii** (Hepp) Zahlbr.

C - Ciri Foddi, 90 m. Leg. NP (GZU), det. J. Hafellner.

N - "Ad corticem Pruni Cerasi, Seui". Leg. Marcucci. (MOD. BAGLIETTO 1879:106).

6 **B. phacodes** Koerb.

C - "Ad Castanearum arbores annosas circum Iglesias". Leg. Canepa. (BAGLIETTO 1879:107).

We have not seen the specimen.

7 **B. plumbina** (Anzi) R. Sant.

Syn.: *Leciographa plumbina* Anzi

C - "Super thallum Pannariae plumbeae circum Ruinas, Gonos Fernadiga (Marc.) haud frequens". BAGLIETTO 1879:121.

We have not seen the specimen.

8 **B. populorum** (Massal.) Trevis.

Syn.: *Bilimbia acclinis* (Flot.) Zahlbr.

C - "In Oleae sylvestris cortice inter Capoterra et S. Lucia". Leg. Canepa. (BAGLIETTO 1879:104, sub *Arthrosporum accline*).

We have not seen the specimen.

9 **B. rosella** (Pers.) De Not.

C - Portixeddu. Leg. E (GZU). - Ruinas. Leg. Marcucci. (BAGLIETTO 1879: 107); we did not see the specimen.

N - Rio Aratu. Leg. NP (GZU). - M. Arcueri, on *Quercus ilex*. Leg. E (HbWB). - M. Arbo. Leg. E (HbWB).

The distribution pattern of this species is rather similar to that of

Bacidia rubella; the lichen, however, is most frequent on smooth bark.

10 B. rubella (Hoffm.) Massal.

Syn.: Bacidia luteola (Ach.) Mudd

C - Orri, on Quercus. Leg. Marcucci. (MOD, BAGLIETTO 1879: 107).

N - P.ta Palai, on Acer. Leg. NP (GZU,TSB). - Esterzili, on Quercus ilex. Leg. E (HbWB) - Aritzo, on Acer. Leg. NP (TSB). - M. Arcueri, on Quercus ilex. Leg. E (HbWB).

A common species in western and southwestern Europe on isolated broadleaved trees with rough bark, mainly on Quercus; see also Bacidia fallax.

11 B. trachona (Ach.) Lett.

S - Capo d' Orso. Leg. E (GZU), det. A.Vežda.

12 Bagliettoa

Like in many other collections of Verrucariaceae, also most specimens of Bagliettoa did not have well-developed spores.

1 B. cazae (Zahlbr.) Vežda et Poelt

N - M. Albo, on limestone. Leg. NP (TSB). - Supramonte di Oliena. Leg. W.

This is an eu-mediterranean species.

2 B. parmigerella (Zahlbr.) Vežda et Poelt

Syn.: Verrucaria sphinctrinella Zsch.

N - M. Arcueri, on limestone. Leg. NP (TSB).

This species grows on limestone rocks which are not, or little, exposed to direct sunlight, within epilithic lichen communities of the Acrocordion conoideae (ROUX 1981).

13 Biatorella

1 B. ochropora (Nyl.) Arn.

N - M. Arcueri, on Quercus ilex. Leg. E (GZU).

The distribution of this species is poorly known. It seems to have disappeared in many parts of its former range, possibly because of increased air pollution.

14 Brodoa

The genus *Brodoa* has been recently split from *Hypogymnia* by GOWARD 1987: it includes the species of the former Section *Solidae*. Since the new genus is easily recognizable and is distinguished by a not too small number of characters, we accept it, contrarily to several genera segregated from *Parmelia* s. lat. in recent times, which often are founded on characters which have, in our opinion, no generic value.

1 *B. atrofusca* (Schaer.) Goward

Syn.: *Parmelia atrofusca* (Schaer.) Crombie, *Hypogymnia atrofusca* (Schaer.) Raes.

N - Bruncu Spina, on acid rock in wind swept ridge. Leg. NP (GZU, TSB). - P.ta Paulinu. Leg. NP (GZU).

2 *B. intestiniformis* (Vill.) Goward

Syn.: *Parmelia encausta* (Sm.) Ach., *Hypogymnia intestiniformis* (Vill.) Raes.

N - Bruncu Spina, on quartz in wind-swept ridge. Leg. NP (TSB).

15 Bryoria

Most of the specimens have been identified by J. Hafellner, with chemical analysis by C. Steyer.

1 *B. capillaris* (Ach.) Brodo et Hawksw.

N - P.ta Palai. Leg. NP (GZU,TSB), B.

A temperate southern boreal species. In Italy it is most common in the beechwoods of the outer prealpine chains, becoming rather rare in central and southern Italy, where it is confined to humid mountain forests. Also known from North America and Japan .

2 *B. fuscescens* (Gyeln.) Brodo et Hawksw.

C - Below P.ta Serpeddi'. Leg. NP (GZU). - Tupa Granella, on *Quercus ilex*. Leg. Tretiach (TSB).

N - P.ta Palai, on *Acer*. Leg. NP (GZU,TSB). - *ibid.*, on *Quercus pubescens*. Leg. B.

S - P.so La Variante. Leg. E (GZU).

A species with wide distribution, probably circumboreal with extensions in the mountains of the temperate zone. Also known from the Canary Islands and East Africa (SEAWARD & HITCH 1982: 17).

- 3 **B. implexa** (Hoffm.) Brodo et Hawksw.
 N - P.ta Palai. Leg. NP (GZU,TSB). - ibid. Leg. WP.
 The sample contains psoromic acid.
- 4 **B. subcana** (Nyl. ex Stizenb.) Brodo et Hawksw.
 N - P.ta Palai. Leg. NP (GZU,TSB).
 O - M. Ferru. Leg. Feige.

16 Buellia

Saxicolous species by C. SCHEIDEGGER

Saxicolous, as well as many corticolous species, especially from the Mediterranean region, are still poorly known. Thus the author of this chapter restricts this contribution to preliminary descriptions of some better known species. Some of the results, particularly those concerning chemistry and spore morphology are new; they are pre-published here as a part of a forthcoming monograph of European saxicolous species of Buellia sect. Buellia. No previously published key can be recommended for the species concept used here, so that a brief description is attached to each taxon. Several unknown taxa collected by Mayrhofer, Nimis and Poelt are not yet discussed here.

- 1 **B. abstracta** (Nyl.) Oliv.
 C - Capo Pecora. Leg. M.
 N - Seui. Leg. M. - Lanusei. Leg. E (GZU).
 Thallus whitish, thin, rimose. Apothecia lecideine, small. Medulla J-. Spores often narrow, 10-12/4-5 μ m, with a faint punctate ornamentation. The type and some previously investigated specimens of this species differ from the material collected in Sardinia in the complete absence of the thallus. Chemistry: norstictic acid. Distribution: Spain, France, Italy.
- 2 **B. alboatra** (Hoffm.) Deichm. et Rostr.
 Syn.: *Diplotomma alboatrum* (Hoffm.) Flot.
 C - Cagliari. Leg. Gennari. (MOD. BAGLIETTO 1879:101). - Portixeddu, on Pinus. Leg. E (GZU).
 N - S'Arcu de Tassucci, on the bole of an old oak. Leg. NP (GZU, TSB). - M. Ortobene, on Populus. Leg. NP (GZU,TSB). - M. Arcueri, on Quercus ilex. Leg. E (GZU). - Aritzo, on Acer. Leg. NP (TSB).
 S - Tavolara, on Quercus ilex. Leg. Brizzi (TSB).

3 **B. ambigua** (Ach.) Malme

C - P.to S. Stefano. Leg. NP (GZU,TSB). - Capo Pecora. Leg. E (GZU, TSB),M.

S - P.ta Falcone. Leg. NP (GZU), W. - M. Russu, on granite near the coast. Leg. E (TSB).

This western, maritime species seems to be not uncommon along the coast of the island, on acidic rock.

4 **B. anomala** Zahlbr.

C - Portixeddu, on Juniperus macrocarpa. Leg. E (HbWB).

N - M. Ortobene, on Populus. Leg. NP (GZU).

S - Badesi Mare, on Juniperus macrocarpa. Leg. E (GZU, HbWB, TSB), conf. Hafellner.

Buellia anomala is a poorly known species belonging to a strange complex of more or less tropical origin.

5 **B. aethalea** (Ach.) Th.Fr. s.lat.

N - M. Limbara. Leg. E (GZU).

Thallus thin, areolate. Apothecia cryptolecanorine. Spores 15-18/7.5-9 μ m with a distinct microrugulate ornamentation. The medulla of the specimen collected in Sardinia is J-. Chemistry: norstictic acid.

6 **B. badia** (Fr.) Massal.

C - P.to S. Stefano, on Aspicilia. Leg. NP (GZU). - Giara di Gesturi, on Acarospora fuscata. Leg. NP (GZU). - M. Arcuentu. Leg. E (GZU, TSB).

N - Torre Argentina, on Parmelia pulla s.l. Leg. NP (GZU,TSB). - Bosa, 12-5 m. Leg. B. - "Super thallum Parmeliae dendriticae iuxta Orri". Leg. Canepa (BAGLIETTO 1879:103). - M. Arbo. Leg. E (SZU).

S - Stintino. Leg. B. - Capo Orso. Leg. E (GZU,TSB),M.

Thallus areolate to squamulose, brown, mostly growing on lichens, e.g. Parmelia pulla, Acarospora microcarpa, Aspicilia caesiocinerea, Caloplaca carphinea, Diploschistes actinostomus, Rinodina alba. Medulla J-. A polymorphic species. Distribution: in Europe widely distributed. Chemistry: no substances found.

7 **B. buellioides** (Metzler ex Arnold) Buschardt

Syn.: Rinodina buellioides Metzler ex Arnold

N - Torre Argentina, with Acarospora lavicola. Leg. NP (GZU).

S - Capo d'Orso. Leg. E (GZU).

Thallus finely areolate, dark brown. Medulla J-. Apothecia cryptolecanorine, disk often faintly pruinose. Spores 9-11/5.5-6.5 μ m, without ornamentation. Chemistry: norstictic acid, rarely stictic acid.

Distribution: southern Europe, central Alps. In the inner alpine dry valleys, according to BUSCHARDT 1979:86, the species mainly grows on siliceous rocks in dry and warm sites.

8 **B. cerussata** Llimona et Werner

C - Isola dei Cavoli. Leg. NP (GZU).

S - Capo d' Orso. Leg. M. - M. Limbara. Leg. E (GZU). - S. Teresa di Gallura. Leg. M.

Prothallus fimbriate. Thallus areolate, white. Medulla J-. Apothecia with a thin or without any margin, disk flat to hemispherical. Spores 9-15/5.5-7 μm , with a distinct rugulate ornamentation. Chemistry: unidentified substance, Rf 4/5/5-6. Distribution: Spain, France, Italy, Greece. *Buellia cerussata* is very closely related to *Buellia fimbriata* (Tuck.) Sheard from California and to *Buellia tesserata* Koerb. from Norway.

9 **B. chlorophaea** (Hepp. ex Leight.) Lett.

N - Desulo. Leg. NP (GZU). - Rio Pardu. Leg. E (TSB).

10 **B. disciformis** (Fr.) Mudd

N - M. Arcueri. Leg. M. - M. Arbo. Leg. E (SZU).

S - P.so La Variante, on *Quercus*. Leg. E (GZU, TSB). - Aggius, on *Quercus suber*. Leg. W (GZU).

Our specimens correspond to the var. *disciformis*. See also SCHAUER 1965: 618.

11 **B. dispersa** (Massal.) Massal.

Syn.: *Buellia tumida* (Massal.) Bagl.

C - M. Arcuentu. Leg. M.

Thallus granular, warty or squamulose, whitish to ochre. Apothecia sessile. Margin persistent, thin, with a brown pigment. Spores 12-14/6.5-8 μm . Wall of younger, slightly pigmented spores with a faint thickening near the septum, without or with a faint microrugulate ornamentation. Chemistry: atranorin, 2'-O-methylperlatolic and confluent acids. Distribution: Mediterranean region, "inner alpine dry valleys".

12 **B. epigaea** (Pers.) Tuck.

N - Arcu Correboi. Leg. B.

The *B. epigaea*-complex has been revised by POELT & SULZER (1974). *B. epigaea* s.str. is well characterized by a non-lobate thallus, reacting K- and the roughly ornamented spores. According to POELT & SULZER (1974:177), the species is confined to substrates where, even if

restricted to small areas, the microclimatic conditions recall those of a semidesert.

13 B. epipolia (Ach.) Mong.

C - M. Arcuentu. Leg. M. - Buggerru, on limestone. Leg. E (GZU, TSB).
- Cagliari. Leg. Gennari. (MOD. BAGLIETTO 1879: 101). - Barumini. Leg. E (GZU, TSB).

N - M. Albo, on limestone. Leg. NP. (TSB). - Between Dorgali and Cala Gonone. Leg. W. - Esterzili. Leg. M. - M. Arcueri, on limestone. Leg. E (GZU, TSB). - Seui. Leg. E (GZU, TSB), M. - Arcu Correboi. Leg. M.

O - Capo Mannu, on basic sandstone. Leg. B.

S - Nuraghe S. Antine. Leg. E (TSB), M. - S. Teresa di Gallura. Leg. M.

A widespread species in the temperate zone, growing on pure limestone and, more rarely, on siliceous rocks (BUSCHARDT 1979:93). It is probably not rare in Sardinia.

14 B. griseovirens (Turn. et Borr.) Almb.

S - P.so La Variante, on Fraxinus ornus. Leg. E (TSB).

15 B. lactea (Massal.) Koerb.

C - Is Pauceris. Leg. NP (GZU).

S - Capo d' Orso. Leg. E (GZU).

Thallus areolate, greyish to whitish, thin to very thick. Medulla J+ blue. Apothecia imate, often with irregular shape, with or without a thin, vanishing margin. Spores 9-15/5.5-7 μ m, without or with a faintly microporate ornamentation. Chemistry: atranorin, norstictic acid. Distribution: Mediterranean region, a few localities in central Europe.

16 B. nivalis (Anzi) Zahlbr. s.l.

Syn.: Buellia margaritacea auct.

C - Baia Chia, with Lecanora lisbonensis. Leg. NP (GZU,TSB). - Capo Pecora, on granite. Leg. E (GZU,TSB),M.

N - M. Arcueri, with Lecanora bandolensis and Lecanora aghardhiana. Leg. E (GZU). - M. Albo, with Dirina stenhammari. Leg. NP (GZU).

O - Capo Mannu. Leg. B.

S - S. Teresa di Gallura, parasite on Diploicia. Leg. E (GZU).

The taxonomy and biology of this taxon should be studied further.

17 B. ocellata (Flotow) Koerb.

N - Arcu Correboi. Leg.M. - Desulo. Leg.NP (GZU). - Su Lappu. Leg. W. Thallus yellowish, areolae scattered or confluent. Medulla J-.

Apothecia cryptolecanorine. Spores 13-16/7.5-8.5 μm , with a distinct microrugulate ornamentation. Chemistry: arthothelin (chemotype II with arthothelin and stictic acid).

18 B. pulverulenta (Anzi) Jatta

N - Arcu Correboi, on *Physconia enteroxantha*. Leg. E (GZU).

Physconia enteroxantha is possibly a new host of this parasitic lichen (HAFELLNER & POELT 1980), which has a very large, but disjunct range in the Holoarctic region, from the Arctic zone to southern Europe and to Asia and southern United States (HAFELLNER 1979:65).

19 B. punctata (Hoffm.) Massal. s.l.

C - Scaffa, near Cagliari, on *Juniperus*. Leg. Canepa. (MOD, under *B. punctiformis*. Also cited by BAGLIETTO 1879: 103). - Portixeddu. Leg. E (SZU).

N - Seui, on rock. Leg. M.

S - P.ta La Variante, on *Quercus suber*. Leg. E (HbWB,SZU). - P.ta Falcone, on *Juniperus*. Leg. NP (TSB).

Thallus brown, rimose to areolate. Medulla J-. Apothecia lecideine, sessile, with a thin margin. Chemistry: no substances found. In the Mediterranean area this group is represented by several species and requires a detailed taxonomic revision.

20 B. reagens H. Magn.

S - M. Limbara, on epilithic mosses. Leg. E (TSB), M.

21 B. sardiniensis Steiner

C - P.ta Serpeddi'. Leg. NP (GZU). - 'Exsicc.: Admixt in Arld. 1702 (HU), leg. Baglietto circa Orri in Sard. merid., exempl. dextrum (HP) sub leptocline" type STEINER 1907:348.

N - Rio Pardu. Leg. E (GZU).

S - Capo d' Orso. Leg. E (GZU,TSB),M.

Prothallus often thick, revolute. Thallus rimose to areolate, whitish, thin. Medulla J+ blue. Apothecia large, up to more than 1 mm in diam., sessile. Margin persistent, thick, with an orange pigment. Disc plane to slightly convex. Spores 12-16/6-8 μm , with psilate or slightly punctate ornamentation. Wall of young spores with faint thickenings near the septum. Spermatia oblong to slightly lageniform, 6.5-8/1.0-1.5 μm . Chemistry: atranorin, gyrophoric acid, lecanoric acid (trace), norstictic acid, connorstictic acid (trace). Distribution: Sardinia. *Buellia sardiniensis* is very close to *B. saxorum*, but differs in the K+ yellow, then red and C- reaction of the upper cortex (norstictic acid absent).

22 **B. saprophila** (B. de Lesd.)

N - Bruncu Spina (below -, ca.1400 m). Leg. NP (GZU).

23 **B. sejuncta** Steiner.

C - "Exicc.:leg. Baglietto circum Orri in Sardin. merid.,exempl. sinistrum in HP". STEINER 1907:358.

Thallus areolate, glossy, whitish. Medulla J-. Apothecial margin and disc as in *Buellia sardiniensis*. Spores 13-18/6.5-8 μm , without ornamentation. Wall of young spores with faint thickening near the septum. Spermatia 10-13/1.0-1.7 μm . Chemistry: atranorin, gyrophoric acid (trace). Distribution: only known from the poorly developed type specimen from Sardinia.

24 **B. stigmatæa** (Ach.) Koerb.

N - Rio Aratu, with *Acarospora smaragdula*. Leg. NP (GZU). - Tortoly (sic). Leg. Marcucci. (MOD. BAGLIETTO:1879:103).

BAGLIETTO cites two further localities: "Orri inter et Sarocc" and "Monte Cepera iuxta Guspis", whose specimens were not found in MOD.

25 **B. subdisciformis** (Leight.) Vain.

C - Below P.ta Serpeddi'. Leg. NP (TSB). - Capo Pecora. Leg. M.

N - M. Arbo. Leg. M. - Rio Pardu. Leg. E (GZU).

S - Capo d' Orso. Leg. E (GZU), M. - S. Teresa di Gallura. Leg. M. - P.so La Variante. Leg. M.

Thallus rimose to areolate, whitish, thick. Medulla J-. Apothecia, margin and disc as in *Buellia sardiniensis*. Spores 12-17/6.5-8.5 μm , with a fine microrugulate ornamentation. Wall of young spores with faint thickening near the septum. Spermatia (7) 9-14/ 1-2 μm . chemistry: atranorin, norstictic acid, connorstictic acid. Distribution: widely distributed through southern and western Europe, near the coasts.

17 Calicium

1 **C. abietinum** Pers.

N - Rio Aratu, on the wood of *Castanea* with *Calicium glaucellum*. Leg. NP (GZU,TSB).

Occurring on lignum of conifers or deciduous trees, from south Scandinavia to the mountains of the Mediterranean region, where it is not rare in suitable habitats (a provisional distribution map in TIBELL 1975:24).

2 C. corynellum Ach.

N - Arcu Correboi, with *Cyphelium lecideinum* on overhanging siliceous rocks, not well developed. Leg. E (GZU).

According to TIBELL 1975: 28, in Scandinavia *Calicium corynellum* occurs mainly in rather humid and shaded localities, almost exclusively under overhanging, siliceous rocks; its distribution extends from the southern boreal to the temperate zone.

3 C. glaucellum Ach.

N - Rio Aratu, on the wood of *Castanea*, with *Calicium abietinum*. Leg. NP (GZU,TSB). - M. Arcueri, Leg. M, E (TSB).

A rather frequent species in northern and central Europe (distribution map in TIBELL 1975:28). In Italy *Calicium glaucellum* has been collected several times in the Alps and along the Apennines to Calabria (specimens in TSB). It is often associated with *Calicium trabinellum*.

4 C. salicinum Pers.

N - M. Arcueri, on *Quercus ilex*. Leg. E (GZU,TSB), M. - M. Arbo. Leg. E (SZU).

Calicium salicinum is most frequent in the temperate and hemiboreal zones; this species most often grows on lignum of conifers, however, according to TIBELL 1975:30 in southern areas it tends also to grow on trunks and lignum of deciduous trees.

5 C. trabinellum Ach.

N - M. Arcueri, with *Calicium glaucellum*. Leg. E (TSB).

A species with a wide zonal and geographical distribution in Europe (TIBELL 1975:32).

18 Caloplaca

This large and very difficult genus is richly represented on the island. Most of the species are commonly grazed by invertebrates and are thus much modified. Many taxa are not clearly defined, others are highly variable; many collections remain unidentified. We often used the paper by EGEA (1982) on the *Caloplaca* species of the Iberian peninsula.

1 C. agardhiana (Ach.) Massal.

N - M. Albo, on limestone. Leg. NP (GZU,TSB).

According to WUNDER 1974:41, *Caloplaca agardhiana* is included with *Caloplaca alociza* but according to the opinions of CLAUZADE & ROUX 1985: 229 the two species should be kept separate. In Sardinia

Caloplaca agardhiana in the sense of the latter authors seems to be much rarer than *Caloplaca alociza*, and probably occurs only at higher altitudes.

2 ***C. alociza*** (Massal.) Migula

C - Buggerru. Leg. M.

N - Supramonte di Oliena. Leg. W. - M. Arcueri. Leg. E (TSB). - Grotte di Nettuno. Leg. W.

S - Capo Caccia, on limestone. Leg. NP (GZU,TSB). - Nuraghe S. Antine. Leg. E (HbWB).

This species is taken up here in the sense of CLAUZADE & ROUX 1985:229. It is a Mediterranean species extending up to central Europe, from sea level to the alpine belt. In Italy it is most frequent in the Southern Alps (WUNDER 1974: 50), but the species is likely to be much more common also in the south. In Sardinia it ought to occur in all calcareous districts.

3 ***C. aractina*** (Fr.) Haeyren

C - Isola dei Cavoli. Leg. NP (GZU, TSB). - P.to S. Stefano. Leg. NP (GZU). - Capo Pecora, with *Lecanora salina*. Leg. E (GZU,TSB), M.

S - P.ta Falcone. Leg. NP (GZU, TSB). - M. Russu, on granite near the coast. Leg. E (TSB). - Stintino, on phyllite. Leg. B.

A preferentially littoral species of little eutrophiated, very hard acid rocks (NORDIN 1972: 161), characterized by the dark thallus and by the blood-red apothecial disks.

4 ***C. arenaria*** (Pers.) Muell. Arg.

C - M. Arcuentu. Leg. M.

N - Rio Madau. Leg. W. - Bruncu Spina. Leg. NP (TSB).

S - M. Limbara, on granitic boulders near a road. Leg. E (TSB).

BAGLIETTO 1879:84 cites a specimen from Cagliari, growing "super terram" as *Calloposma arenarium*. Although we have not examined this specimen, we think it is most probably *Caloplaca teicholyta*.

5 ***C. atra*** ined.

N - M. Arcueri, with *Caloplaca coronata*. Leg. E (GZU).

This is the same lichen as reported by POELT & MAYRHOFER (1985) from eastern Austria.

6 ***C. atroflava*** (Turn.) Mong. var. ***submersa*** (Nyl.) Magn.

N - Rio Pardu. Leg. E (GZU). - P.ta Palai, river bottom, periodically submerged. Leg. NP (GZU,TSB).

The relationship of this characteristic lichen on semi-inundated rocks

to *Caloplaca atroflava* is not clear to us.

7 *C. aurantia* (Pers.) Hellb.

C - 6 Km W of Riola. Leg. WP.

N - M. Tuttavista. Leg. B. - Grotte di Nettuno. Leg. W.

S - Tavolara. Leg. Brizzi (TSB). - Capo Caccia, on limestone. Leg. NP (GZU, TSB).

Caloplaca aurantia seems to be much less frequent on the island than the closely related *Caloplaca flavescens* (= *C. heppiana*); it seems that specimens of *Caloplaca flavescens* with more flattened lobes are often mistaken for *Caloplaca aurantia* (also by us at the start of this study). However, a collection from Capo Caccia, where the two species were adjacent, gave us a clearer understanding of the two taxa.

8 *C. aurantiaca* s. ampliss.

Collections of *Caloplaca* with a white to pale-yellowish thallus and orange to yellowish apothecia which could not be named are united under this name. Such forms are widely distributed and common on the island. They need a thorough revision. Several taxonomic entities are probably involved. We thought that it was not useful to cite the localities.

9 *C. boulyi* (Zahlbr.) Steiner et Poelt

Syn.: *Xanthoria lobulata* (Flk.) B. de Lesd.

C - Barumini, on *Prunus*. Leg. NP (TSB, GZU).

Regarding the taxonomy, nomenclature, ecology and distribution of this species, see STEINER & POELT 1982.

10 *C. carphinea* (Fr.) Jatta

C - "Ad rupes porphyricas secum viam circa Orri et in cacuminibus Flumini-Bina". Leg. Canepa. (MOD. BAGLIETTO 1879: 70).

S - Capo d' Orso, on granite. Leg. M, E (GZU, TSB).

This comparatively rare species is confined to very hard acidic rocks, mostly along the coast. EGEA & LLIMONA (1983 fig.18) report it also from some inland stations in southeastern Spain.

11 *C. cerina* (Ehrh. ex Hedw.) Th.Fr.

C - Below P.ta Serpeddi', on *Quercus ilex*. Leg. NP (TSB).

N - M. Ortobene, on *Populus*. Leg. NP (GZU, TSB). - Rio Aratu, on *Pyrus*. Leg. NP (GZU). - Aritzo, on *Acer*. Leg. NP (TSB). - Arcu Correboi. Leg. B.

S - Altopiano di Campeda. Leg. B.

Typical *Caloplaca cerina* appears to be restricted to the montane belt on the island.

12 **C. cerina** var. **muscorum** (Massal.) Jatta

C - Below P.ta Serpeddi', on epilithic mosses. Leg. NP (TSB).

N - Arcu Correboi. Leg. B, E (SZU,TSB).. - M. Albo, on epilithic mosses (limestone). Leg. NP (TSB). Rio Pardu, on Grimmia. Leg. E (GZU).

According to POELT (1969:165) *Caloplaca cerina* var. *muscorum* mainly occurs on mosses on acid rocks at low elevations, and seems to be relatively frequent in the Mediterranean region. The entire range of *Caloplaca cerina* with its many forms is not clear. *Caloplaca stilicidiorum* (Vahl.) Lynge, commonly accepted as an independent species, cannot be separated from the complex by the characters that are generally used.

13 **C. cerina** var. **cyanolepra** (DC.) Kickx

C - Portixeddu, on *Juniperus*. Leg. E (GZU,TSB).

See note to the foregoing taxon.

14 **C. cerinella** (Nyl.) Flag.

N - M. Ortobene, on *Populus*. Leg. NP (TSB). - Lanusei, on *Juglans*. Leg. E (TSB).

15 **C. cerinelloides** (Erichs.) Poelt ined.

C - Portixeddu, on *Acacia*. Leg. E (HbWB) - ibid., on *Pinus*. leg. E (GZU).

Under this name we include corticolous collections which are similar in their habit to *Caloplaca cerinella*, but regularly have only 8 spores in the asci. More material needs to be studied to attain a clearer concept of this group.

16 **C. chalybaea** (Fr.) Muell. Arg.

C - "Ad saxa calcarea in horto academico Cagliari (Canepa)". (BAGLIETTO 1879:82, we did not see the specimen).

N - Supramonte di Oliena. Leg. W (GZU).

S - Capo Caccia, on limestone. Leg. NP (TSB).

? - Sine localitate, in BARBEY 1884: 106.

A central and south European species with a few southern outliers in North Africa. The specimen from Capo Caccia grew at the lowest elevation in the Mediterranean region (see WUNDER 1974: 78). This well-circumscribed species is reduced to the status of a form of *Caloplaca variabilis* by CLAUZADE & ROUX 1985:229; we do not agree with this because we observed both species growing side by side without intermediates on several occasions; *Caloplaca chalybeia* maintains its

characteristic features throughout its large range.

17 C. chlorina (Flot.) Sandst.

O - Busachi, on granite. (MAMELI 1920:168, under *Caloplaca cerina* var. *chlorina*); we did not see the original material.

The correct interpretation of *Caloplaca chlorina* remains unclear. The name is often used for any saxicolous form of the *Caloplaca cerina* complex.

18 C. chrysophthalma Degel.

N - M. Ortobene, on *Populus*. Leg. NP (GZU,TSB).

A very rare species, probably extinct in large parts of its former range. Recent collections in Italy are from the Trieste Province, the low Friulian plain and the outskirts of Rome, all on *Populus* (TSB).

19 C. citrina (Hoffm.) Th.Fr.

C - M. Arcuentu, on volcanic rocks. Leg. E (HbWB,TSB). - Baia Chia, on limestone. Leg. NP (GZU,TSB). - Buggerru, together with *Caloplaca lithophila*. Leg. E (GZU). - "Haud infrequens ad rupes calcareas Cagliari et in finitimis (Gennari, Canepa). (BAGLIETTO 1879: 83). - Santadi. Leg. Tretiach (TSB).

N - M. Mannu, not frequent, inbetween *Caloplaca irrubescens*. Leg. NP (GZU). - M. Ortobene, on *Populus*. Leg. NP (TSB).

S - Tempio Pausania, on *Ulmus*, not typical. Leg. E (GZU,TSB). - Nuraghe S. Antine, on the wall of a house. Leg. E (TSB).

A more or less temperate, very nitrophilous species with a wide distribution. The epiphytic form was previously treated as a species as *Caloplaca phlogina* (Ach.) Flag. (see NORDIN 1972: 109). It is not clear to us whether all sorediate crustaceous saxicolous *Caloplas* with yellow, non-effigurate thallus represent a single taxon.

20 C. cf. conciliascens (Nyl.) Zahlbr.

N - Desulo. Leg. NP (GZU).

Caloplaca conciliascens is very close to *Caloplaca execut*a (Nyl.) DT. et S., from which it differs in the flat, blackish apothecia, the lower hymenium and the different spores. Up to now it was only known from the locus classicus in Tirol. (WUNDER 1974: 137). The identification of the specimen from Sardinia is not completely certain; the thallus is J-.

21 C. conglomerata (Bagl.) Jatta

N - Torre Argentina, on rock. Leg. NP (GZU,TSB).

O - Nuraghe Tradori. Leg. W (GZU).

S - Torralba. Leg. M.

This very characteristic species was originally described from Tuscany; it is a Mediterranean lichen with a range extending northwards to the southern Alps (BUSCHARDT 1979:116). It is possible that *Caloplaca amabilis*, a species described from Western North America, is identical to *Caloplaca conglomerata*. The disjunct distribution pattern, Mediterranean region-western North America, is well known for many species of lichens and other cryptogams.

22 C. conversa (Krempelh.) Jatta

C - M. Arcuentu. Leg. M (GZU). - Buggerru, on limestone, with *Lecanora poeltiana*. Leg. E (GZU), det. H. Wunder.

This small lichen with a dark thallus is easily overlooked. It grows on limestone or basic silicates, often with cyanobacteria. Its hitherto known range was from the west Pyrenees and the Balearic Islands to Czechoslovakia via the Alps (WUNDER 1974; VEZDA 1978: 416).

23 C. coronata (Krempelh.) Steiner

N - M. Arcueri, on limestone. Leg. E (GZU).

Caloplaca coronata is a species of southern Central Europe and of the mountains of the Mediterranean area; its total range is probably submediterranean. It grows on eutrophiated limestone in sunny situations.

24 C. crenularia (With.) Laund.

Syn.: *Caloplaca festiva* (Ach.) Zw.

C - Giara di Gesturi. Leg. NP (GZU,TSB). - Road Arbus-Buggerru, on hard silicates. Leg. E (TSB), M.- Rio Is Fonsuas. Leg. Tretiach (TSB). - S. Pantaleo. Leg. Tretiach (TSB). - Capo Pecora. Leg. M, E (TSB).

N - Rio Aratu. Leg. NP (GZU), W. - Rio Madau. Leg. W. - Su Lappu, on dead *Parmelia*. Leg. W. - Bruncu Spina. Leg. NP (TSB). - Bosa. Leg. B. - Nuoro. Leg. B. - Villanova Strisaili, on granite. Leg. B. - Lanusei, on a wall. Leg. E (GZU,TSB). - Esterzili, on superficially decalcified limestone. Leg. E (GZU). - Arcu Correboi. Leg. M.

S - P.ta Falcone. Leg. W. - Aggius. Leg. W. - Stintino, on phyllitic rock. Leg. B. - Mara. Leg. B. - Altopiano di Campeda, on basaltic rock. Leg. B. - M. della Neula, on granite. Leg. B. - M. Limbara, on periodically inundated granitic rocks. Leg. E (GZU,TSB), M. - S. Teresa di Gallura, on granite. Leg. M. - Capo d' Orso, on granite, with *Protoparmelia* sp. Leg. E (TSB), M. - M. Arcueri. Leg. E (TSB). - Tavolara, on granite. Leg. Brizzi (TSB).

Several localities also in BAGLIETTO 1879:85, as *Calloporisma ferrugineum*

(most specimens in MOD). *Caloplaca crenularia* is presumably widespread and common in those areas of the island with siliceous rock. The species is very variable and the limits between it and some allied taxa need to be more accurately defined. The collections of M. Limbara indicate that, besides the normal form, there is a form with a grey thallus and dark apothecia with blackish margin and dark ochraceous to blackish disk; here and there it can be seen that the regenerating margins have the typical red colour. These specimens look like a species described as *Lecanora submergenda* Nyl. in a rivulet in France, but they appear to be a modification resulting from seasonal inundation. The species needs to be studied more intensively. It is unfortunate that the well known name *Caloplaca festiva* has been changed before the intricate taxonomy of this group has been solved.

25 *C. crenularia* (With.) Laund. var.

N - Bruncu Spina. Leg. NP (GZU).

This specimen seems to belong to *Caloplaca crenularia* s.lat. It has a dark grey, somewhat squamulose thallus. Its apothecia are externally blackish, with a dark ferrugineous disk. No algae are present in the medulla of the exciple. The hypothecium is dark brownish in older apothecia, the epihymenium is bluish green with reddish granules on its surface.

26 *C. decipiens* (Arn.) Jatta

C - "Passim ad rupes calcareas prope Cagliari (Canepa)". (BAGLIETTO 1879: 71)

We have not seen the specimen. This lichen is said to be generally common from the Mediterranean region to central Europe, with a broad ecological range (up to the alpine belt), often growing on artificial substrates. Its distribution in Italy is, however, not very clear; i.e. the species seems to be absent or at least very rare in the entire northeast of the country. For the taxonomy and distribution of this lichen see NORDIN 1972: 61.

27 *C. dolomiticola* (Hue) Zahlbr.

- M. Arcueri, on limestone, severely damaged by invertebrates. Leg. E (GZU).

This species often starts its development as a parasite on *Caloplaca variabilis*. *C. dolomiticola* is widespread on limestone in the southern part of central Europe and at higher altitudes in the Mediterranean region.

Most often it is named *Caloplaca velana* (Massal.) DR. (DU RIETZ 1925:45) The type material of this taxon is extremely damaged by

invertebrates. One of the authors (J. P.) is unable to match with certainty the type material of *C. velana* with the much better developed type of *C. dolomiticola*.

28 *C. erythrocarpa* (Pers.) Zw.

Syn. : *Caloplaca lallavei* (Clem.) Flag.

C - Barumini, on limestone rocks. Leg. E (GZU,TSB). - "Cagliari et in vicinias (Gennari, Canepa)" (Three samples in MOD. BAGLIETTO 1879: 84). - "Ad rudera di S. Lucifero, Cagliari (Canepa)." BAGLIETTO 1879: 84 as *Callophisma visianicum* (MOD).

N - M. Albo, on limestone. Leg. NP (GZU,TSB). - Arcu Correboi. Leg. B. - Esterzili, on limestone in garigue vegetation. Leg. E (GZU), M. - M. Arcueri, on limestone. Leg. E (TSB), M.

This species is probably widespread at lower and intermediate elevations on limestone and other more or less calcareous rocks, but not common.

29 *C. ferrarii* (Bagl.) Jatta s.lat.

C - Buggerru. Leg. E (GZU).

N - Desulo. Leg. NP (GZU). - Esterzili. Leg. M. - Seui. Leg. M.

The taxonomy and variability of this species are not yet clearly understood. Probably the name covers different taxa. See also the discussion made by CRESPO & BUENO 1982 and the note on *Caloplaca marmorata*.

30 *C. ferruginea* (Huds.) Th. Fr.

C - Giara di Gesturi, on *Quercus suber*. Leg. W. - Below P.ta Serpeddi', on *Quercus ilex*. Leg. NP (TSB).

N - M. Arbo. Leg. E (TSB), B. - Rio Aratu, on *Quercus*. Leg. NP (TSB). - M. Albo, on *Quercus ilex*. Leg. NP (TSB). - M. Arcueri. Leg. M. - Rio Pardu. Leg. E (GZU). - Arcu Correboi. Leg. E (GZU). - M. Ortobene. Leg. Pertot (TSB).

S - P.so La Variante, on *Pyrus*. Leg. M, E (SZU). - Aggius (2 Km NNE from-). Leg. W.

Several localities are also cited in BAGLIETTO 1879:85: Iglesias, Pula, Orri, S. Lucia, Scaffa, all in the Province of Cagliari (Leg. Gennari, Canepa), Seui in the Province of Nuoro (Leg. Marcucci). The shade-forms of this lichen have more or less orange-yellow apothecia and can be distinguished from other corticolous taxa by the thickness of the apothecia and by the lack of algae in the medulla of the exciple. In this species the phycobiont normally lies only under the discs of the apothecia.

31 C. flavescens (Huds.) Laund.

Syn.: *C. heppiana* (Muell. Arg.) Zahlbr.

C - Buggerru. Leg. E (GZU,TSB). - Cagliari and surroundings, on limestone. Leg. Canepa. (MOD. BAGLIETTO 1879: 71, as *Amphiloma murorum*). - Santadi. Leg. Tretiach (TSB).

N - Desulo. Leg. NP (GZU,TSB). - Supramonte di Oliena. Leg. W. - M. Albo, on limestone. Leg. NP (GZU,TSB). M. Arcueri, on limestone. Leg. E (GZU,TSB), M.

O - Capo Mannu, on limestone and sandstone. Leg. B.

S - Capo Caccia, with *Verrucaria "heppianae"*, on limestone. Leg. NP (GZU, TSB).

A widely distributed species in Europe, with a marked southern tendency. In Sardinia it appears to be rather frequent on basic substrates.

32 C. flavorubescens (Huds.) Laund.

Syn.: *Caloplaca aurantiaca* auct. p.p.

C Buggerru. Leg. E (GZU). - "In cortice Fici Caricae et ad trabes prope Cagliari". Leg. Canepa. (BAGLIETTO 1879:83).

N - Seui, on *Ulmus*. Leg. E (GZU,TSB) - M. Ortobene, on *Populus*. Leg. NP (GZU,TSB). - P.ta Palai. Leg. NP (TSB). - M. Arcueri, on *Acer*. Leg. E (GZU,TSB). - Seui. Leg. Marcucci. (MOD. BAGLIETTO 1879:83).

The species is probably widespread in Sardinia, although always collected in small quantities.^f

33 C. flavovirescens (Wulf.) DT. et S.

C - M. Arcuentu. Leg. M, identification not certain.

34 C. fulvolutea (Nyl.) Jatta

N - Bruncu Spina, on *Grimmia*. Leg. NP (GZU,TSB).

For this long time forgotten species, which is always more or less parasitic on mosses of the genus *Grimmia*, see HANSEN et al. 1987 (in prep.).

35 C. fuscoatroides Steiner

C - P.ta Serpeddi'. Leg. NP (GZU,TSB). - Giara di Gesturi. Leg. NP (TSB). - Nora. Leg. NP (GZU). - S. Pantaleo. Leg. Tretiach (TSB).

N - Lanusei, on a wall, together with *Caloplaca crenularia*. Leg. E (GZU). - M. Arcueri, with *Lecanora xanthostoma* s. lat. Leg. M. - S'Arcu de Tascussu, with *Lecidella stigmatia*. Leg. NP (GZU). - M. Albo. Leg. NP (GZU). - Esterzili, on *Aspicilia*. Leg. E (GZU).

This species, described from the isle of Delos (Greece) (STEINER 1919: 69), seems to be widespread throughout the Mediterranean region. In

habitus it is somewhat intermediate between *Caloplaca crenularia* and *Caloplaca percrocata*, but has a more or less squamulose, deep grey or greenish grey thallus, which is very variable in the often lobe-like marginal areoles. At least at early stages of development it appears to be parasitic on other lichens. The species is probably more frequent in Sardinia than our records indicate.

36 "C. granulosa (Muell. Arg.) Jatta"

C - "In rupibus calcareis Cagliari (Canepa)". (MOD. BAGLIETTO 1879: 71; Erb. Crittog. Ital. Ser. II 165, as *Amphiloma granulorum* Muell. Arg.).

The collections cited by BAGLIETTO op.cit. belong to a taxon which is probably closely related to the true *Caloplaca granulosa*, but which lacks the typical isidiate granules on the thallus, which are the main character of *Caloplaca granulosa*. At the moment we have no clear ideas about this taxon and prefer to leave it ad int. under this name pending further research.

37 C. grimmiae (Nyl.) Oliv.

C - P.ta Serpeddi'. Leg. NP (TSB). - Rio Alino. Leg. Tretiach (TSB). - M. Maxias. Leg. Tretiach (TSB).

N - Desulo. Leg. NP (GZU). - Torre Argentina. Leg. NP (GZU). - Bidicolai. Leg. B. - Arcu Correboi. Leg. M.

S - Capo d' Orso. Leg. M.

The name *Caloplaca grimmiae* must be used instead of *Caloplaca congregiensis* for the taxon parasitic on *Candelariella vitellina*; see POELT & KALB 1985 (with distribution map).

38 C. haematites (Chaub.) Zw.

C - Barumini, on *Prunus*. Leg. E (TSB). - "Ad corticem Pruni, Castaneae, Ceratoniae et praesertim Fici Caricae circum Iglesias et prope Cagliari." Leg. Canepa. (Several specimens in MOD. BAGLIETTO 1879:84). - Portixeddu, on *Acacia*. Leg. E (SZU), M.

N - M. Ortobene, on *Populus*. Leg. NP (GZU,TSB). - Arcu Correboi, on *Quercus pubescens*. Leg. B. - Nuoro, on *Ficus carica*. Leg. B. - Lanusei, on *Juglans*. Leg. E (TSB). - ibid. Leg. Marcucci (MOD. BAGLIETTO 1879:84).

S - Altopiano di Campeda, on *Ulmus*. Leg. B.- SS. Trinita' di Saccargia, on *Ulmus*. Leg. E (TSB).

The collection from Nuoro included some apothecia with paler coloured red-orange discs; these do not belong to *C. cerina* but are shade-forms of *C. haematites*. The species is mainly restricted to the south of Europe, with rare, isolated outliers up to the southwest of central

immersed in the host. In *Caloplaca grimmiae* (see POELT & KALB 1985) the parasite penetrates the host by a kind of "foot" and a true thallus is absent. In *Caloplaca magni-filii*, which belongs to a completely different group as does *Caloplaca interna*, the thallus is developed as small groups of algae surrounded by hyphae. A more detailed study of the morphology of *Caloplaca interna* was not attempted to avoid destruction of the scarce material; it is very probable that the species is developing an internal thallus. The host is an *Aspicilia* of the calcarea-complex. The species was growing together with *Xanthoria calcicola*, *Parmelia pulla* coll. *Acarospora* sp.; on the same *Aspicilia* thallus there was another parasite: *Caloplaca inconnexa* var. *nesodes*. Some of the apothecia of the new species were infected by *Cercidospora caudata*. Further locality:

O - Nuraghe Tradori, with *Caloplaca conglomeraata*. Leg. W (GZU,W).

44 C. imbricaria (Nyl.) Zahlbr.

C - Giara di Gesturi. Leg. NP (GZU,TSB). - M. Arcuentu. Leg. E (GZU,TSB).

N - M. Albo. Leg. NP (GZU). - M. Mannu. Leg. NP (GZU). - Torre Argentina. Leg. NP (GZU,TSB).

O - Nuraghe Tradori. Leg. W.

A Mediterranean species extending north to the dry valleys of the Alps (BUSCHARDT 1979:131) and central Europe (map in WIRTH 1972: 79). It grows on basic to neutral siliceous rocks. It is probably widespread on the island, at least in districts with basalt rocks.

45 C. lactea (Massal.) Zahlbr.

C - Buggerru. Leg. M. - Capo Caccia, on small calcareous pebbles. Leg. Pertot (TSB).

N - Esterzili, calcareous rocks in garigue vegetation. Leg. E (GZU,TSB), M; a form with short, relatively wide spores.

This is a southern species in Europe, with outliers in limestone areas of central Europe up to south Norway (POELT & BUSCHARDT 1978: 126); it is a pioneer lichen colonizing small calcareous pebbles on the surface of the soil. The specimens collected in Sardinia are somewhat different from those from central Europe. The material cited in BAGLIETTO 1879: 135 as *Calloporisma luteoalbum lacteum* does not belong to *Caloplaca lactea*, but to *Caloplaca aurantiaca* s. ampliss. (specimens in MOD).

46 C. littorea C. Tav.

S - P.ta Falcone. Leg. NP (GZU,TSB). - Stintino, on phyllitic rock. Leg. B

A south western species in Europe, distributed from Scotland to the

Mediterranean region. In the north of its European range *Caloplaca littorea* is a strictly maritime species. According to SEAWARD & HITCH 1982: 23) it can occur some distance from the coast in the Mediterranean region.

47 *C. mamorata* (Bagl.) Jatta 1900:251.

Typus: Sardinia, Cagliari "ad rupes calcareas pone plateam armorum (Canepa)", MOD, resp. in Erb Crittog. Ital. Ser. II Nr. 67.

(BAGLIETTO 1879: 84, as *Callophisma mamoratum*, with description).

All the specimens of this species seen in different herbaria are heavily damaged by invertebrates. Some of the "characters" of the taxon are due to damaging and regeneration. However, specimens almost certainly belonging to *Caloplaca mamorata* from the same locality, labelled with the - not published - name *Blastenia ferruginea* var. *carolitana* BAGLIETTO allow to identify the lichen. It appears that with the name *Caloplaca mamorata* a widespread lichen of the southern Mediterranean region is involved, known from northern Africa, Jugoslavia, Greece. The following synonymy seems to belong to that taxon according to the description and to the specimens that we could see:

Syn.: *Gyalolechia cinnabarina* FLAGEY Rev. Mycol. 17: 104 (1895) (non *Caloplaca cinnabarina* (Lam.) Zahlbr. 1907 !) = *Caloplaca flageyana* ZAHLBRUCKNER Cat. Lich. Un. 7:130 (1931).

Syn.: *Lecanora lactea* f. *fulva* HARMAND 1913:863 = *Caloplaca lactea* f. *fulva* (Harm.) Zahlbr. Cat. Lich. Un. 7: 151 (1932).

Syn.: *Gyalolechia lactea* f. *rubra* B. DE LESD. Bull. Soc. Hist. Nat. de l'Afrique du Nord 6:2 (1911) aud Bull. Soc. Bot. France 58:551 (1911) = *Caloplaca lactea* f. *rubra* (B. de Lesd.) Zahlbr. Cat. Lich. Un. 7: 152 (1931).

Probably there are still more synonyms for this widespread species which is characterized by the thin to endolithic thallus of whitish colour, the small reddish orange to rusty red apothecia with very thin margin and the elliptical spores with mostly thin septum. The spores are in the rule somewhat thicker than those of *Caloplaca lactea* (see the drawing in CLAUZADE & ROUX 1985:248), whereas the spores of *Caloplaca lactea* are nearly identical to those of *Caloplaca ferrarii*. *Caloplaca mamorata* is known in many collections from the surroundings of Cagliari; it grows on limestone. The thallus varies from totally endolithic on pure limestone to slightly epilithic when growing on marl or on calcareous sandstone.

48 *C. microthallina* Wedd.

S - P.ta Falcone, not typical. Leg. W.

This species, described from western France and known also from northern Europe, was overlooked for a long time. See also NORDIN 1972.

49 *C. oasis* (Massal.) Szat.

- Orani, on *Verrucaria glaucina* growing on limestone. (MAMELI 1920:168, as *Caloplaca aurantiaca* oasis; we did not see the specimen). - Grotte di Nettuno. Leg. W.

According to POELT (1981:148) this species attains a maximum frequency in submediterranean Europe. It is parasitic on endolithic lichens (generally *Verrucariaceae*).

50 *C. ochracea* (Schaer.) Flag.

C - "In rupibus calcareis a Bonaria, Cagliari". Leg. Marcucci. (MOD. BAGLIETTO 1879:84).

N - M. Albo, on limestone. Leg. NP (GZU, TSB). - M. Tului, on limestone. Leg. B.

Caloplaca ochracea is a submediterranean to Mediterranean-montane species. In Italy it occurs throughout the country, on somewhat shaded limestone rocks.

51 *C. ora* Poelt et Nimis spec. nov.

Typus: Corsica, Ajaccio: Scopulus La Parata dictus, alt. 10-30 m s.m., ad saxa granitica maritima 3.7.1969. Leg. J. Lambinon, Y. Rondon & A. Vežda, in A. Vežda, Lich. sel. exs. 849 (sub *Caloplaca marina*).

Similis *Caloplacae marinae* (Wedd.) Zahlbr., differt statura graciliore, apotheciis minoribus subconcoloribus aurantiacis, marginibus laevibus, paraphysibus tenuioribus et sporis minoribus.

Thalli of irregular shape, often confluent and then covering large areas, crustose-areolate to clearly effigurate at the margins, without a distinct prothallus, areolate or cracked in the central parts, with a somewhat uneven surface, orange. Apothecia numerous, sparse or more often in groups, of rounded or irregular shape, 0.2-0.5-0.8 mm diam.; disc more or less flat, margin thin. Disc and margin of the apothecia orange, the disc somewhat darker. Paraphyses 1-1.5 μ m thick, little thickened at the apex. Spores 8 per ascus, measuring 10-12 x 4-6 μ m, septa 3-5 μ m thick.

Caloplaca ora seems to have been identified as *Caloplaca marina* in previous collections from the Mediterranean region, and the two species are rather similar as far as their general habit and ecology are

concerned (maritime rocks). *Caloplaca marina* is a stouter lichen in all its parts, its thallus is more yellow, the areoles are not infrequently convex or even almost pedicellate, the apothecia larger, the disc and the margin differing in colour, the paraphyses, at least in part, thicker (up to 2-5 μm), the spores generally larger. From material of *Caloplaca marina* from Norway we have got the following measures: 12.5 - 13.5 x 5.5-7.5 μm , the septa 3.5-4 μm ; NORDIN 1972 gives the values of 10-16 x 4-8 μm .

Caloplaca ora is known from several localities in Sardinia, Corsica and Majorca. The material from Sardinia perfectly corresponds to the lichen distributed by VEŽDA (Lich. Sel. Exs. 849) from Ajaccio, Corsica, as *Caloplaca marina*. As this is widely distributed in the herbaria, it is has been adopted as type material of the new species. For the atlantic distribution of the closely related *Caloplaca marina* see NORDIN 1972: 11. *Caloplaca ora* often occurs with *Buellia ambigua*, *Lecanora salina*, *Caloplaca littorea*; sometimes it grows many meters above sea level, much higher than *Caloplaca marina* normally does.

Further localities:

- C - Isola dei Cavoli. Leg. NP (GZU, TSB). - Capo Pecora, with *Lecanora salina*. Leg. E (GZU, TSB), M. - S.ta Catterina di Pittinuri. Leg. WP.
- S - S. Teresa di Gallura, on granite. Leg. M. - P.ta Falcone. Leg. NP (GZU, TSB), W. - Stintino, on phyllitic rock, together with *C. littorea*. Leg. B. - M. Russu, on granite near the coast. Leg. E (TSB).

52 *C. percrocata* (Arnold) Steiner

C - Giara di Gesturi. Leg. NP (GZU). - Nora. Leg. NP (GZU).

N - M. Arcueri. Leg. E (GZU). - S' Arcu de Tascussi. Leg. NP (GZU).

The identity of these specimens is rather doubtful. Typical *Caloplaca percrocata* is known from basic silicates in the alpine belt of the Alps.

53 *C. pollinii* (Massal.) Jatta

C - "Ad Ceratoniam circum Cagliari". Leg. Canepa (MOD. BAGLIETTO 1879: 85).

This is a Mediterranean species. In Italy it is known from several stations along the Tyrrhenian coast of the Peninsula, mostly growing on twigs and branches of littoral shrubs (very often *Juniperus*) in coastal maquis vegetation.

54 *C. proteus* Poelt

N - M. Arcueri, overhanging calcareous rocks, with *Caloplaca flavescens*. Leg. E (GZU, TSB).

This species has been described from the Alps; its previously known range extends from south Norway (an isolated station, see NORDIN 1972:144-145), to the south European mountains (POELT 1969: 185). CLAUZADE & ROUX 1985: 234 include this species in *Caloplaca cirrochroa*, as subspecies *fulva* (Koerb.) Clauz. et Roux. We do not agree with such an arrangement: *Caloplaca proteus* always differs from *Caloplaca cirrochroa*, and remains distinct in sites where the two species are adjacent. As both must have developed independently from different non-sorediate ancestors, it seems to be unwise to unite them as the same species.

55 *C. pyracea* (Ach.) Th.Fr. s.lat.

C – Portixeddu, on Acacia and Pinus. Leg. M, E (GZU, TSB, HbWB).

O – Stagno di Cabras, on Opuntia. Leg. B.

S – Capo Orso, on shrubs. Leg. E (TSB). – Badesi Mare, on Juniperus. Leg. E (TSB).

The *Caloplaca pyracea* complex is very poorly understood, and awaits a critical revision; for this reason we prefer to use the well known, long time used name *C. pyracea* instead of *Caloplaca holocarpa*.

56 *C. rinodinae-albae* Poelt et Nimis spec. nov.

Typus: Sardinia, Prov. Cagliari, Isola dei Cavoli, S Capo Carbonara, in praeruptis septentrionem versus spectantibus. 18.7.1985. Leg. P.L. Nimis & J. Poelt (Holotypus: GZU; isotypus: TSB).

Thalli parvi, rotundati, aurantiaci, parasitice vigentes in *Rinodina alba*. Apothecia parva, lecanorina. Cellulae superiores paraphysium saepe quasi inflatae. Sporae octonae, late ellipsoideae ad subglobosae septis crassis.

Thallus parasitic on *Rinodina alba*, small, rounded, pale orange, to 5-8 mm diam., sometimes thalli confluent forming larger patches, crustose, continuous to squamulose-areolate, some of the areolae slightly lobulate, 0.2-0.5 mm diam. Apothecia sparse, or clustered, to ca. 1 mm diam., but often smaller, with a thick, at least at the beginning prominent margin and plane disc, red-orange. Apothecia lecanorine, the medulla mostly occupied by phycobiont cells. Cortex thin, paraplectenchymatous, with cells to 5 μ m thick. Parathecium strongly conglutinated, radially expanded at the margin. Hymenium 70 μ high. Paraphyses at the basis 1.5-2 μ m thick, the last 2-3 terminal cells (those reaching the surface of the disc) rounded to markedly swollen, up to 7 μ m thick. Spores 8 per ascus, broadly ellipsoid to globose, 9-15.5 x 7.5-9 μ m, the globose ones 7-8 μ m.

The new species is characterized by its parasitic growth on *Rinodina alba*, the small size of the thalli and the apothecia, the very thick

swollen cells of the paraphyses and the broadly elliptical to globose spores. Its growth in isolated patches on the host suggests obligate parasitism. Associated with the host we noted *Caloplaca aractina*, *Lecanora salina*, *Tephromela atra*, *Parmelia pulla* s.l.

57 *C. rubelliana* (Ach.) Lojka

O – Nuraghe Tradori. Leg. W (GZU).

This lichen is widespread in the Mediterranean region, with outliers in the dry alpine valleys (BUSCHARDT 1979: 137) and isolated stations northwards to central Europe.

58 *C. sarcopidoides* (Koerb.) Zahlbr.

C – Road Arbus-Buggerru. Leg. M.

N – M. Arcueri. Leg. M.

The species was originally cited as "*sarcopisioides*" by Koerber. SANTESSON 1984:76 uses the orthographically more correct form "*sarcopidoides*", which we follow. The lichen is very small, and has been probably often overlooked. For its distribution in Spain, see the discussion in ATIENZA & CRESPO 1984.

59 *C. sarda* Poelt et Nimis spec. nov.

Typus: Sardinia, Prov. Nuoro, Monti del Gennargentu, 3 Km SW of Desulo along the road to Aritzo, ca. 950 m. 20.7.1985. Leg. P.L. Nimis & J. Poelt (GZU, holotypus).

Rupicola, in schistis aridis. Thalli parvi, ad 5 mm metientes, passim confluentes, compacti, rimosi-areolati areolis planis, pallide aurantiacis, marginibus acutis. Apothecia unum ad dua pro areola, immersa vel vix protrudentia, aurantiaca, marginibus tenuibus ad reductis. Structura subparaplectenchymatica parietibus hypharum crassis. Parathecium subparaplectenchymaticum. Hymenium tenue. Paraphyses sat crassae, valde conglutinatae apicibus leviter clavatis. Sporae comparatae parvae.

Thallus epilithic, compact, small, to 5 mm diam., sometimes confluent, rimose-areolate with small, flat, angular, pale orange areolae (0.2–0.5 mm diam.). Apothecia one to two per areole completely immersed or weakly emerging, in which case with a thin proper margin, otherwise immarginate, orange, with a plane disc.

Thallus subparaplectenchymatous throughout, with angular, thick-walled cells: in the gonidia-free lower medulla they measure 3–6 μm , in the cortex they are horizontally elongate and may reach up to 8 μm . The parathecium is radially expanded at the margin, and is also of subparaplectenchymatous structure, with strongly conglutinate-swollen hyphae. Hymenium ca. 50 μm high, strongly conglutinate, the paraphyses

2.0-2.5 μm thick at the base, only slightly thicker towards the apex, the terminal cells (in water) difficult to distinguish, in KOH + dissolving. Spores mostly badly developed or only partially ripe, broadly ellipsoid, ca 11-12 x 6.5-8.5 μm , with a septum that is 2.5-3 μm thick at maturity.

The new species occupies a very isolated position in the European lichen flora. It is characterized by the compact, areolate thalli and above all by the immersed apothecia. The species that most resembles it is *Caloplaca rubelliana*, which, however, is easily distinguished by the blood-red discs, the smaller size of the areoles and of the disc. *Caloplaca sarda* ought to be a rather xerophytic species. The south-facing slopes below Desulo lie in the rain-shadow of the surrounding mountains.

60 *C. saxicola* (Hoffm.) Nordin

C - "In rupibus calcareis Cagliari et in locis adiacentibus, iuxta Orri ad muros". Leg. Canepa. (MOD. BAGLIETTO 1879: 71). - Giara di Gesturi. Leg. E (GZU).

N - Between Cala Gonone and Dorgali. Leg. B. - Desulo, on metamorphic hard rocks. Leg. NP (GZU,TSB). - Arcu Correboi, on schist. Leg. E (GZU,TSB).

Caloplaca saxicola is a widespread species in Europe, with a wide ecological tolerance (see NORDIN 1972: 87-104).

61 *C. schaeereri* (Flk.) Zahlbr.

N - M. Albo, on limestone. Leg. NP (GZU,TSB). - Between Dorgali and Cala Gonone. Leg. W.

We are very doubtful about the identification of these specimens and even the validity of the taxon itself. It might well be, that *Caloplaca schaeereri* is nothing more but an invertebrate browsed and subsequently regenerate form of *Caloplaca dolomiticola*.

62 *C. scotoplaca* (Nyl.) H. Magn.

C - M. Arcuentu. Leg. E (GZU,TSB).

S - Capo d' Orso. Leg. M, E (GZU,TSB). - S. Teresa di Gallura. Leg. E (GZU). - Torre Argentina. Leg. NP (GZU). - Rio Aratu. Leg. NP (GZU).

The identification of this *Caloplaca* with a greyish areolate thallus and relatively small orange apothecia on hard granite is not certain. At the moment we cannot suggest any better name for the specimens collected in Sardinia. The species seems to be characteristic of very hard rocks.

- 63 **C. subchrysea** Wern. em. Clauz. et Roux v. **luteococcinea** Clauz. et Roux
N - M. Albo. Leg. NP (GZU). Revised by C. Roux.

According to CLAUZADE & ROUX 1985: 251 this rarely collected variety, characterized by the intensely yellow, areolate thallus with a blackish-blue hypothallus, is identical to *Caloplaca africana* sensu Clauzade.

- 64 **C. subpallida** H. Magn.

N - Seui. Leg. M.

This is a "difficult" species, whose circumscription, ecology and distribution should be studied furthermore.

- 65 **C. teicholyta** (Ach.) Steiner

Syn. *Blastenia visianii* Massal.

C - "Ad rudera di S. Lucifero, Cagliari (Canepa)". (MOD. BAGLIETTO 1879: 84, as *Calloposma visianicum* Massal.) - Santadi. Leg. Tretiaich (TSB).

Probably also the specimen cited by BAGLIETTO 1879 84 as *Calloposma arenarium*, collected "super terram circum Cagliari" by Canepa, belongs here.

- 66 **C. tenuatula** (Nyl.) Zahlbr.

C - Capo Gaccia, on *Verrucaria* sp. Leg. NP (GZU,TSB).

N - M. Albo, on *Bagliettoa* sp. Leg. NP (GZU,TSB). - M. Arcueri. Leg. E (TSB).

This is a widespread Mediterranean species, parasitic on several species of *Verrucariaceae*.

- 67 **C. thallincola** (Wedd.) DR.

C - Isola dei Cavoli. Leg. NP (GZU).

The specimen has the typical spores and the almost shining surface of *Caloplaca thallincola* but the lobes are shorter and more flattened. The species has a wide distribution along the coasts of northern and western Europe. See also NORDIN 1972.

- 68 **C. variabilis** (Pers.) Muell. Arg.

C - Cagliari (BAGLIETTO 1879:82; BARBEY 1884: 106). - Buggerru. Leg. E (GZU).

N - M. Albo, on limestone. Leg. NP (TSB). - M. Arcueri. Leg. E (TSB). - Esterzili. Leg. E (GZU), M.

O - Batumea di Baressa (13 Km west of Barumini). Leg. W.

S - Tavolara. Leg. Brizzi (TSB).

A species with wide ecological amplitude, from western and central

Europe to the northern part of the Mediterranean region (WUNDER: 1974: 108). The species is widespread and certainly common on calcareous substrates throughout Sardinia.

69 C. sp.

N - Esterzili, on *Quercus ilex*. Leg. E (GZU).
Thallus somewhat granular-isidiate like that of *Caloplaca herbidella*, but the apothecia are a pure orange. To be studied further.

19 Candelaria

1 C. concolor (Dicks.) Stein.

N - M. Ortobene, on *Populus*. Leg. NP (TSB).
This species, very common on eutrophiated bark of isolated trees throughout the rest of Italy (mostly below the montane vegetation belt), appears to be surprisingly rare in Sardinia.

20 Candelariella

1 C. aurella (Hoffm.) Zahlbr.

C - Barumini. Leg. E (GZU, TSB).
N - M. Albo, on limestone. Leg. NP (TSB). - Desulo. Leg. NP (TSB). - Bosa (North of-). Leg. B.
S - Tavolara. Leg. Brizzi (TSB).
A widespread and common species, probably present everywhere in the island on calcareous substrates, also inside larger towns. We noted the species in many other locations without collecting it.

2 C. medians (Nyl.) A. L. Sm.

C - Cagliari, on limestone. (MOD. BAGLIETTO 1879: 70, as *Amphiloma medians*).
A widespread nitrophilous species in western Europe, extending northwards to western Germany, where it is spreading within urban areas. In Italy it is rather widespread, but not always frequent, throughout the country.

3 C. reflexa (Nyl.) Lett.

C - Barumini, on *Prunus*. Leg. E (TSB).
S - Lanusei, on *Tilia* along a road. Leg. E (TSB).
Candelariella reflexa has been often mistaken with other lichens in the Italian herbaria, so that it was considered as a rather rare species,

but recent collections (deposited in TSB) show its presence in many localities of the country (Trieste Karst, where it is very abundant, Friulian lowland, Venice, Latium, Puglie, Calabria, Sicily etc.). Probably the species has been overlooked or it has been confused with other lichens, since it occurs almost always in the sterile state. *Candelariella reflexa* seems to be widespread above all in areas with submediterranean conditions.

4 *C. vitellina* (Hoffm.) Muell. Arg.

C - Capo Pecora on granite along the coast. Leg. M. - Isola dei Cavoli, on granite. Leg. NP (GZU,TSB). - P.ta Serpeddi', on siliceous rock. Leg. NP (GZU,TSB). - Below P.ta Serpeddi'. Leg. NP (TSB). - Giara di Gesturi, on basalt. Leg. NP (TSB), W - Is Pauceris. Leg. NP (TSB). - M. Arcuentu, on siliceous rock. Leg. E (TSB), M. - M. Sette Fratelli. Leg. WP. - Tupa Granella, on hard siliceous rock. Leg. Tretiach (TSB). - Santadi. Leg. Tretiach (TSB).

N - Rio Pardu, on *Grimmia*. Leg. E (GZU). - M. Arcueri. Leg. M. - P.ta Paulinu, on *Grimmia*. Leg. NP (GZU,TSB). - Torre Argentina (a form with subumbilicate thallus). Leg. NP (GZU). - Desulo. Leg. NP (GZU), (TSB). - Rio Madau. Leg. W. - Bidicolai, on granite. Leg. B. - Bosa, on liparite. Leg. B. - P.ta Palai, on porphyric rock. Leg. B. - ibid, on mosses. Leg. Pertot (TSB). - Badde Orca. Leg. Pertot (TSB). - Arcu Correboi, on schists an over epilithic mosses. Leg. E (HbWB, TSB). - Nuraghe Mereu. Leg. E. Pignatti (TSB). - M. Ortobene, on granite. Leg. Pertot (TSB).

O - Nuraghe Tradori. Leg. W.

S - M. Limbara, on granite. Leg. E (GZU, SZU, TSB). - ibid. on *Grimmia*. Leg. Pertot (TSB). - P.so La Variante. Leg. E (SZU). - Tavolara, on granite. Leg. Brizzi (TSB). - Nuraghe Loelle. Leg. Pertot (TSB).

Candelariella vitellina appears to be a very common species on siliceous rocks throughout the island, from sea level to the highest mountains.

5 *C. xanthostigma* (Ach.) Lettau

C - Tupa Granella, on the bark of an old specimen of *Quercus ilex*. Leg. Tretiach (TSB).

N - P.ta Palai, on *Quercus pubescens*. Leg. NP (TSB). - M. Arcueri, on *Quercus ilex*. Leg. NP (TSB). - Arcu correboi, with *Parmelia elegantula*. Leg. E (GZU).

Candelariella xanthostigma is another species which has been often overlooked or confused with other lichens, since it generally occurs in the sterile state. In Sardinia it appears to be rather unfrequent and it is probably restricted to the mountains.

21 Carbonea

1 *C. supersparsa* (Nyl.) Hertel

N - Desulo, on *Lecanora polytropa*. Leg. NP. (GZU).

2 *C. vitellinaria* (Nyl.) Hertel

C - P.ta Serpeddi'. Leg. NP (TSB) - Below P.ta Serpeddi'.

N - Arcu Correboi. Leg. E (HbWB,TSB)

S - M. Limbara. Leg. M (GZU).

In all collections this species was growing on *Candelariella vitellina*; we also observed it elsewhere; it is probably not rare on the island.

22 Catapyrenium

by O. BREUSS

The genus *Catapyrenium* has recently been separated again from *Dermatocarpon* Eschw.; it includes squamulose lichens which are attached to the substrate by rhizohyphae and have one-celled spores. The greater proportion of the species are terricolous or epibryophytic. The number of species reported from Sardinia is currently relatively small, and the list of species is expected to increase with further collecting.

1 *C. adami-borosi* (Szat.) O. Breuss comb. nov.

Basionym: *Placidium adami borosi* O. Szatala in Ann. Mus. Nat. Hungar. ser. VII, p.271 (1956).

N - Rio Aratu. Leg. NP (GZU).

This taxon is closely related to *C. lachneum*. It has been collected only rarely, and always in southern Europe (Hungary, Spain, Cyprus). Our material is in accord with the characters of the type specimen.

2 *C. cinerum* (Pers.) Koerb.

N - P.ta Paulinu, on soil. Leg. NP (GZU,TSB).

This is a common species in the Arctic and Boreal regions, and in the Alps; its occurrence in the above locality is not surprising.

3 *C. compactum* (Massal.) R. Sant.

C - Capo Pecora. Leg. M. - M. Arcuentu, with *Placocarpus schaeferi* on *Lecanora muralis*. Leg. E (GZU).

This identification is not completely certain, since several entities can be distinguished within this polymorphic species, whose taxonomic status is in need of clarification. The collection of Capo Pecora

consists of scattered squamules on granite among several crustose lichens and is at least in part certainly epiphytic-parasitic.

4 **C. daedaleum** (Krempelh.) B. Stein

N - P.ta Paulinu, on soil. Leg. NP (GZU,TSB).

As *Catapyrenium cinereum*, this species also has an arctic-alpine distribution, but is generally less common.

5 **C. pilosellum** O. Breuss ined.

C - Buggerru, on limestone. Leg. E (GZU).

N - Arcu Correboi, on epigaeic mosses, with *Fulgensia* cf. *subbracteata*. Leg. B. - Grotta Su Mammuri, on soil over limestone.

Leg. B. - M. Arcueri, on soil over limestone Leg. E (GZU).

The formal description of this (sub)-atlantic-mediterranean species, which is related to *C. lachneum*, will be given in a forthcoming paper, containing a revision of the European species of this genus.

6 **C. rufescens** (Ach.) O. Breuss

N - M. Albo. Leg. NP (GZU,TSB).

C. rufescens is a widespread species in Europe which becomes rarer northwards.

7 **C. squamulosum** (Ach.) O. Breuss

Syn.: *Dermatocarpon hepaticum* auct.

C - Buggerru, on soil over limestone. Leg. B, E (GZU,TSB). - Barumini, in fissures between the stones of a Nuraghe. Leg. E (HbWB).

N - Dorgali, on saxicolous mosses. Leg. B. - Arcu Correboi, on soil. Leg. B. - M. Arcueri. Leg. E (GZU).

O - Capo Mannu, on soil, together with *Psora decipiens*. Leg. B.

As *C. rufescens*, *C. squamulosum* has a distribution pattern centered on southern Europe. No specimens of the sibling species *C. michelii* (Massal.) R. Sant. are known from Sardinia.

23 Catillaria

Most of the saxicolous species have been identified by H. KILIAS (herbarium quotation with *). See also KILIAS 1981.

1 **C. chalybeia** (Borr.) Massal. var. **chalybeia**

C - Road Arbus-Buggerru. Leg. M (GZU), E (HbWB). - "In rupibus inter S. Barbara atque Cioffa (Canepa). (BAGLIETTO 1879: 103). - Isola

- dei Cavoli. Leg. NP (GZU*). - Is Pauceri. Leg. NP (GZU*). - S. Pantaleo. Leg. Tretiach (TSB).
- N - M. Albo. Leg. NP (GZU*). - Desulo. Leg. NP (GZU*). - P.ta Palai. Leg. NP (GZU*).
- S - S. Teresa di Gallura. Leg. M (GZU). - P.ta Falcone, on acid rocks. Leg. NP (GZU,TSB). - M. Mannu. Leg. E (GZU*).
- 2 C. chalybeia** var. **chloropoliza** (Nyl.) Kilius
 C - Portixeddu. Leg. M.
 S - P.ta Falcone. Leg. E (GZU*).
- 3 C. detractula** (Nyl.) Oliv.
 N - M. Arcueri, on calcareous rocks. Leg. E (GZU).
 O - Capo Mannu, on limestone and sandstone. Leg. B.
- 4 C. lenticularis** (Ach.) Th. Fr.
 C - Baia Chia, on limestone. Leg. NP (GZU, Det. M. Mayrhofer). - Buggerru, on limestone near the coast. Leg. E (GZU,TSB). - "In insula S. Simone prope Cagliari (Canepa), ad saxa calcarea". (BAGLIETTO 1879:136, as Biatorina lenticularis Koerb., we did not see the specimen). - Santa Lucia. Leg. NP (GZU*).
- N - M. Arcueri, on limestone, with Caloplaca flavescens. Leg. E (GZU,TSB). - Supramonte di Oliena. Leg. W. - Rio Aratu. Leg. NP (GZU*).
- S - Capo Caccia, on limestone. Leg. NP (TSB). - Tavolara. Leg. Brizzi (TSB).
- 5 C. mediterranea** Hafellner
 C - Portixeddu, on bark. Leg. E (HbWB, GZU), confirm. Hafellner.
 N - M. Tului, 200-400 m, on Juniperus phoenicea. Leg. B.
- The species was collected with Catillaria nigroclavata with which is macroscopically identical. It differs from this species in having asci with 16 spores, 6.5-7.8 x 2.0-2.5 μ m size. However, the type of Catillaria mediterranea appears to be parasitic on Anaptychia ciliaris, so that our lichen may belong to another taxon. This species complex is in need of a revision.
- 6 C. nigroclavata** (Nyl.) Schul.
 N - M. Ortobene, on Populus. Leg. NP (TSB). - M. Tului, on Juniperus phoenicea. Leg. B. - M. Albo, on limestone (!); identification not sure. Leg. NP (GZU*).
- S - Tempio Pausania. Leg. M.

7 **C. scotina** (Koerb.) Hertel et Kiliass

N - M. Albo, a damaged specimen. Leg. NP (GZU*).

Catillaria scotina is only known from a few localities in southern central Europe.

24 **Cercidospora**

1 **C. caudata** Kernst.

N - Torre Argentina, in the apothecia of Caloplaca interna. Leg. NP (GZU).

This lichenicolous fungus, which is parasitic in the hymenium of several species of Caloplaca, is known from a few collections from southern and central Europe.

2 **C. ulothii** Koerb.

C - Orri "super thallum Placodium saxatilis (Canepa)" (BAGLIETTO 1979:122 as Cercidospora epipolytropa).

We have not seen the specimen cited by BAGLIETTO loc. cit.; presumably, Placodium saxatilis is an error for Placodium saxicola, now Lecanora muralis. Since as far as we know Cercidospora epipolytropa is specialized on the Lecanora polytropa group, and Cercidospora ulothii on the Lecanora muralis aggregate, the material collected by Canepa should belong to the latter species.

25 **Cetraria**

1 **C. chlorophylla** (Willd.) Vain.

N - M. Arbo, a very small specimen. Leg. NP (TSB).

In Italy the species is known from the Alps to Calabria, occurring in the montane to the subalpine vegetation belts. In the south of the country it is rather rare and confined to humid beechwoods.

2 **C. hepatizon** (Ach.) Vain.

N - "Sterilis, tantum in M. Gennargentu a Prof. Gennari reperta". (MOD. BAGLIETTO 1879: 65, as Parmelia fahlunensis).

In Italy the species is known to occur from the Alps to Sicily (Madonie Mts.).

3 **C. pinastri** (Scop.) Gray

S - M. Limbara, on Pinus. Leg. E (SZU).

In Italy Cetraria pinastri has a natural range that includes the Alps

and the northern Apennines southwards to Tuscany (distribution map available by NIMIS ined.). There are a few scattered stations as far as Calabria (Aspromonte): in the latter cases the lichen was growing on alien trees (mainly *Larix*).

26 *Chaenotheca*

1 *C. brunneola* (Ach.) Muell. Arg.

N - M. Arbo, on a decorticated stump of *Quercus ilex*. Leg. E (TSB).
A species with a very wide range of distribution, occurring in Europe, Asia, North and South America, Africa (TIBELL 1980: 24).

2 *C. carthusiae* (Harm.) Lettau

N - M. Arcueri. Leg. E (GZU,TSB), det. J. Hafellner.
According to TIBELL 1980: 26, *Chaenotheca carthusiae* has a wide zonal distribution occurring in the boreal zone and in corresponding oroboreal zones in Europe and North America. Our locality is the most southern one for Europe.

3 *C. trichialis* (Ach.) Th.Fr.

N - M. Arbo, on an old specimen of *Quercus ilex*. Leg. E (TSB).
This is one of the commonest species of *Chaenotheca* in Europe, occurring both on lignum and on the bark of deciduous trees or conifers.

27 *Chaenothecopsis*

1 *C. subpusilla* (Vain.) Tibell

N - M. Arcueri. Leg. M, E (TSB).
This find is rather unusual for this species, which is normally found on lignum of conifers in the Boreal and southern Boreal zones. According to TIBELL 1975: 48 *Chaenothecopsis subpusilla* often grows with *Calicium glaucellum* and *Calicium trabinellum*, as it occurred in the cited collection.

28 *Chromatochlamys*

1 *C. mscorum* (Fr.) Mayrh. et Poelt

N - Rio Pardu. Leg. E (GZU).
This recently resurrected genus was for a long time included in

Microglaena: see MAYRHOFER & POELT 1985.

29 Chrysothrix

1 *C. candelaris* (L.) Laund.

Syn.: *Lepraria candelaris* (L.) Fr.

C - Giara di Gesturi, on *Quercus suber*, in fissures of the bark, not common. Leg. NP (TSB).

N - M. Arcueri, on *Quercus ilex*. Leg. E (TSB).

30 Cladonia

BAGLIETTO 1879:90-93 cites four further species of *Cladonia*, that have not been collected by us: *C. botrytes*, *C. gracilis* (var. *macroceras*), *C. uncialis* (var. *leptostelis*) and *C. rangiferina* (from Seui, the specimen from M. Sette Fratelli proved to be *C. arbuscula*). Since we have not seen the relevant specimens, these species are not listed below.

1 *C. arbuscula* (Wallr.) Rabenh. subsp. *arbuscula*

N - Arcu Correboi, on soil. Leg. Friedrich. (HbWB) det. T. Ahti.
Passo di Caravai. Leg. Friedrich. (HbWB), det. T. Ahti. - M. Sette Fratelli. Leg. Gennari. (MOD. BAGLIETTO 1979:93, sub *C. rangiferina*).

O - Porta Badde Urbara, on soil (basaltic rocks). Leg. Gutermann. (HbWB), det. T. Ahti.

S - M. Limbara. Leg. E (TSB), M.

The identity of these specimens is not completely clear. *Cladonia arbuscula* is a more or less boreal-alpine species. These locations constitute its southernmost localities in Italy.

2 *C. cenotea* (Ach.) Schaer.

C - Rio Alino, on a decorticated stump. Leg. Tretiach (TSB).

3 *C. cervicomis* (Ach.) Flot. var. *cervicomis*

N - P.ta Palai, on soil. Leg. NP (TSB). - Rio Pardu. Leg. E (GZU).

S - M. Limbara. Leg. E (GZU, SZU, TSB). - P.so La Variante. Leg. E (SZU). - M. Russu. Leg. E (TSB).

4 *C. cervicomis* var. *verticillata* (Hoffm.) Ahti

C - "In cacuminibus Flumini-Bina (Canepa), in monte Sette Fratelli (Gennari), super saxa vulcanica in M.Ferru (Marcucci)". (BAGLIETTO

1879:91-92, we did not see the specimens).

N - M. Arcueri. Leg. M.

S - Aggius. Leg. W. - P.so La Variante. Leg. E (SZU,TSB).

5 C. chlorophaea (Flk. ex Sommerf.) Sprengel s str.

C - Capo S. Elia, Leg. ? (MOD). - S. Barbara. Leg. Canepa (MOD).

N - Bosa, on epilithic mosses. Leg. B, det. T. Ahti. - Nuraghe Mereu, 700 m. Leg. E. Pignatti (TSB). - Bruncu Spina, 1700 m. Leg. Pignatti (TSB). - Neoneli, near Sorgono, on soil (MAMELI 1920: 169). - M. Ortobene. Leg. Pertot (TSB).

S - Sassari (surroundings of-). Leg. Bizzeddu (TO). - Capo Caccia. Leg. Feige. - M. Limbara. Leg. E (SZU).

All of the specimens in TSB and MOD have been examined by TLC and contain only fumarprotocetraric acid. For a survey of the *Cladonia chlorophaea* complex in Italy see COASSINI-LOKAR et al. 1986. See also note on *Cladonia pyxidata*.

6 C. coccifera (L.) Willd.

N - P.ta Palai, on acid rock and epilithic mosses. Leg.B. - Bruncu Spina, on soil (acid rocks). Leg. NP (TSB).

S - M. Limbara. Leg. E (GZU,SZU,TSB).

C. coccifera is a circumboreal species, relatively frequent on acidic substrate also on the highest Mediterranean mountains. Its range in Italy extends to Sicily (Madonie Mts., TSB).

7 C. conoidea Ahti

S - Aggius. Leg. W.

Of the species of the *Cladonia chlorophaea* complex, *Cladonia conoidea* is mostly restricted to the Mediterranean part of Italy (COASSINI-LOKAR et al. 1986).

8 C. coniocraea auct.

N - M. Arbo, on an old stump. Leg. E (TSB).

9 C. convoluta (Lam.) P.Cout.

C - Below P.ta Serpeddi', on soil. Leg. NP (TSB). - Capo Malfatano. Leg. Feige - M. Sette Fratelli. Leg. Gennari. (MOD. BAGLIETTO 1879:90). - Cagliari. Leg. Canepa (MOD. BAGLIETTO 1879:90).

N - Between Cala Gonone and Dorgali, on soil. Leg. B. - M. Albo, on calcareous soil in open grassland. Leg. NP (TSB). - ibid. Leg. Pertot (TSB). - M. Arcueri, on calcareous soil. Leg. E (TSB). - Grotte di Nettuno. Leg. W.

O - Capo Mannu. Leg. B, Feige.

S - Stintino. Leg. B. - Capo Caccia, on calcareous soil. Leg. NP (TSB). - Alghero. Leg. Pertot (TSB).

A very common species on limestone soils in open vegetation throughout the Mediterranean region, with extensions to central Europe. In Mediterranean Italy it is very often associated to *Cladonia rangiformis* and *Cladonia furcata* subsp. *subrangiformis*.

10 C. cyathomorpha W.Watson

O - M. Ferru, on the mossy bark of *Quercus ilex*. Leg. B.

S - Mara, on epilithic mosses. Leg. B.

This is a probably suboceanic species, whose distribution is very incompletely known. The identifications are by T. Ahti.

11 C. fimbriata (L.) Fr.

C - Giara di Gesturi. Leg. NP (TSB). - M. Sette Fratelli. Leg. Gennari (BAGLIETTO 1979:91).

N - P.ta Palai, on the mossy bark of *Quercus pubescens*. Leg. B, det. T. Ahti. - Aritzo. Leg. Gennari (MOD. BAGLIETTO 1879:91). - Rio Pardu. Leg. E (GZU).

12 C. firma (Nyl.) Nyl.

Syn.: *Cladonia nylanderi* P.Cout.

C - Isola di S. Antioco. Leg. Feige. - M. Arcuentu, on soil over siliceous substrate. Leg. E (TSB). - S. Pantaleo. Leg. Tretiach (TSB).

N - Villanova Strisaili, on soil. Leg. B. - P.ta Palai, on epilithic mosses. Leg. NP (TSB,GZU). - Dorgali, on epigaeic mosses and soil. Leg. B. - Torre Argentina, on soil. Leg. NP (TSB). - Rio Pardu, on soil. Leg. E (GZU).

S - Altopiano di Campeda, on epilithic (basalt rock) mosses. Leg. B.- M. Limbara, on soil. Leg. E (SZU,TSB). - M. della Neula, on soil. Leg. B. - M. Scala, on soil. Leg. B. - P.so La Variante, on soil. Leg. E (HbWB,TSB). - M. Russu, on soil in open garigue vegetation. Leg. E (TSB).

This species seems to be rather frequent throughout Sardinia; it grows on acid or subneutral soil within open grassland or garigue vegetation. The specimens collected by W. Brunnbauer (B) have been identified by T. Ahti.

13 C. foliacea (Huds.) Willd.

C - Costa Verde, on soil. Leg. B. - Barbusi, 170 m. Leg. WP. - Villacidro, on soil over granite. Leg. WP.

N - Arcu Correboi, on soil. Leg. B. - Rio Pardu, with *Cladonia*

firma. Leg. E (GZU). - P.ta Palai, on epilithic mosses. Leg. NP (TSB), B. - Dorgali, on mosses and soil. Leg. B.

- S - M. Scala, on soil. Leg. B. - Altopiano di Campeda, on epilithic mosses (basalt rocks). Leg. B. - Stintino. Leg. B. - P.so La Variante. Leg. E (SZU,TSB). - M. Limbara. Leg. E (SZU,TSB). - Isola di Caprera. Leg. Gestro (BAGLIETTO 1879:90). - Aggius. Leg. W. - M. Russu. Leg. E (TSB).

Another frequent species in open garigue or grassland vegetation; ecologically, it resembles *C. convoluta*, preferring soils overlying acid substrates. The specimens collected by W. Brunnbauer (B) have been identified by T. Ahti.

14 *C. furcata* (Huds.) Schrad. subsp. *furcata*

C - "Super terram in Valle Canonica circum Iglesias, in finitimis Cagliari (Canepa). (BAGLIETTO 1879:92, we have not seen the specimens).

N - P.ta Palai, on epilithic mosses. Identification (by T. Ahti) not certain. Leg. B. - Bruncu Spina, on epilithic mosses (acid rock). Leg. NP (TSB). - M. Arcueri. Leg. E (TSB). - Seui. Leg. Marcucci. (BAGLIETTO 1879:92).

S - M. Limbara, on acid soil. Leg. E (GZU,TSB), M.

In Sardinia *Cladonia furcata* subsp. *furcata* is most frequent on the mountains.

15 *C. furcata* subsp. *subrangiformis* (Sandst.) Pišut

S - M. Russu, on soil in open maquis vegetation. Leg. E (TSB).

This subspecies, at least in Italy, seems to be most frequent in the lowlands, where it is often associated with *Cladonia convoluta* and *Cladonia rangiformis*.

16 *C. humilis* (With.) Laund.

Syn.: *Cladonia conista* (Nyl.) Robbins

O - M. Ferru, on soil, 600 m. Leg. B, det. T. Ahti.

17 *C. macilenta* Hoffm.

S - P.so La Variante. Leg. E (GZU).

? - "Ad ligna putrescentia". Leg. Moris. (MOD. BAGLIETTO 1879:91).

According to CHRISTENSEN 1987 this species should include also *Cladonia bacillaris* Nyl. as a chemical strain. Our material (from P.so La Variante) reacts K+ deep yellow and seems to contain thamnolic acid.

18 *C. macrophyllodes* Nyl.

S - M. Limbara. Leg. E (GZU).

Cladonia macrophyllodes is an arctic-alpine species. In the cited station it was growing on acid soil over granitic substrate.

19 ***C. mediterranea*** Duvign. et Des. Abb.

O - M. Ferru, on soil. Leg. Feige.

This is a rare species with a southern Mediterranean-atlantic range (also occurring in Macaronesia). In Italy it is known from a few stations located along the Tyrrhenian coast, from Liguria to south Latium.

20 ***C. pocillum*** (Ach.) O. J. Rich.

C - Cagliari, et in finitimis. Leg. Gennari, Canepa (Four specimens in MOD. BAGLIETTO 1879:91).

N - M. Albo, on calcareous soil. Leg. NP (TSB). - ibid. Leg. Pertot (TSB). - M. Arcueri. Leg. E (SZU).

O - M. Ferru, on *Quercus ilex* and on soil. Leg. B, det. T. Ahti.

S - In insula Caprera. Leg. Gestro (BAGLIETTO 1879:91). - Capo Caccia. Leg. Pertot (TSB). - Anghelu Ruju. Leg. Pertot (TSB).

This taxon is easy to distinguish from the other forms of the *Cladonia pyxidata-chlorophaea* complex on the basis of morphological characters. It is not clear to us whether it really deserves to be treated at species rank.

20 ***C. pocillum*** (Ach.) O.J. Rich. var. ***pachyphyllina*** (Wallr.)

O - M. Ferru, 600 m, on *Quercus ilex*. Leg. B. det. T. Ahti.

21 ***C. pyxidata*** (L.) Hoffm. s.l.

N - Bruncu Spina, on epigeic mosses. Leg. NP (TSB). - Grotte di Nettuno. Leg. W.

S - M. Limbara. Leg. E (SZU). - Lago di Baratz. Leg. Pertot (TSB).

This species is frequent throughout the island, see also BAGLIETTO 1879:91: "Ad terram, truncosque arborum, saxa vulgatissima". The delimitation from *Cladonia chlorophaea* s. str. (strain with fumarprotocetraric acid only) is not distinct to us.

22 ***C. ramulosa*** (With.) Laund.

Syn.: *Cladonia anomaea* (Ach.) Ahti et P. James

S - Mara, on epilithic mosses, together with *C. pyxidata*. Leg. B, det. T. Ahti.

23 ***C. rangiformis*** Hoffm.

C - Below P.ta Serpeddi', on soil. Leg. NP (TSB). - Isola di S. Antioco. Leg. Feige. - Road Arbus-Buggerru. Leg. E (SZU, TSB). -

"Frequens ad fastigia Flumini-Bina et circum Cagliari (Gennari, Canepa)", (Several specimens in MOD, BAGLIETTO 1879:92, as *C. furcata pungens*). - Isola di S. Simeone (MAMELI 1920:169, as *Cladonia muricata*). - Tupa Granella. Leg. Tretiach (TSB).

N - M. Ferru, on soil. Leg. B. - Arcu Correboi, on soil. Leg. B, E (SZU). - P.ta Palai, on epilithic mosses. Leg. B. - Nuche Sicca, on soil. Leg. B. - Bruncu Spina, on soil. Leg. NP (TSB). - P.ta Palai, on epigaeic mosses. Leg. NP (TSB). - M. Albo, on calcareous soil. Leg. NP (TSB). - Rio Pardu, on soil. Leg. E (GZU). - M. Arcueri. Leg. M. - Supramonte di Oliena. Leg. W.

O - M. Ferru, on soil. Leg. B.

S - Stintino, on soil. Leg. B. - M. Russu, on soil in littoral maquis. Leg. E (TSB). - P.so La Variante. Leg. E (SZU,TSB). - In insula Caprera. Leg. Gestro (BAGLIETTO 1879:92, as *Cladonia furcata pungens*). - M. Limbara. Leg. E (SZU). - P.ta Falcone. Leg. Pertot (TSB).

A very common species on more or less calcareous soil throughout southern Europe, extending into dry limestone areas of central Europe. In the Mediterranean area the species is rather variable, both morphologically and chemically. Some specimens, reacting P+ red, have very thin, densely branched, partly decorticated podetia (f. *aberrans* Des Abb. ?), and appear distinct from typical *C. rangiformis*. The specimens collected by Brunnbauer (B) have been identified by T. Ahti.

31 *Clauzadea*

1 *C. chondrodes* (Massal.) Clauz. et Roux

Syn.: *Lecidea chondrodes* (Massal.) Malbr.

C - "In saxosis calcareis Cagliari" (BAGLIETTO 1879:100).

N - Between Dorgali and Cala Gonone. Leg. W.

2 *C. immersa* (Web.) Hafellner et Bellemere

Syn.: *Protoblastenia immersa* (Hoffm.) Stein; *Lecidea i.* (Hoffm.) Ach.

C - "In saxosis calcareis Cagliari frequens et in viciniis ubi Biatorae chondrodi sociata crescit" (BAGLIETTO 1879:100).

N - M. Albo, on limestone. leg. NP (GZU,TSB).

3 *C. monticola* (Ach.) Hafellner et Bellemere

Syn.: *Lecidea fuscorubens* Nyl., *Protoblastenia monticola* (Ach.) Stein., *Lecidea monticola* (Ach.) Schaer.

N - M. Albo, on limestone. Leg. NP (GZU,TSB). - Supramonte di Oliena. Leg. W.

32 *Clypeococcum*

1 *C. sp.*

N - Desulo, parasitic on *Caloplaca*. Leg. NP (GZU).

33 *Coelocaulon*

1 *C. aculeatum* (Schreb.) Link

N - P.ta Palai, on acid rock. Leg. NP (TSB). - Arcu Correboi. Leg. E (SZU). - P.so La Variante. Leg. E (SZU).

2 *C. crespae* Barreno et Vasquez

S - M. Limbara, on *Juniperus*, with abundant apothecia. Leg. E (TSB, GZU).

The species was hitherto known only for the western Iberian Peninsula (distribution map in KAERNEFELT 1986: 68). This is the most eastern known locality for this taxon.

3 *C. muricatum* (Ach.) Laund.

N - Bruncu Spina. Leg. NP (GZU, TSB).

O - M. Ferru. Leg. W.

S - Arcu Correboi on soil over acid rock. Leg. E (TSB).

For the ecology and distribution of this species see KAERNEFELT 1986: 68.

34 *Collema*

Of the 35 species present in Europe, 8 are reported from Sardinia by BAGLIETTO 1879. We have checked most of the specimens on which his citations are based. The nomenclature mostly follows that in the monograph of DEGELIUS 1954 and 1974, in which only one species is recorded from Sardinia.

1 *C. auriforme* (With.) Coppins et Laund.

Syn.: *Collema auriculatum* Hoffm.

N - M. Albo, on epilithic mosses. Leg. NP (TSB). - Laconi, on mosses. Leg. Canepa (MOD.BAGLIETTO 1879:118, as *Collema granosum*).

S - Tavolara, on limestone. Leg. Brizzi (TSB).

This is a widespread species, mostly on epilithic mosses on limestone, ranging from south Scandinavia to north Africa.

- 2 **C. crispum** (Huds.) G.H. Web.
 C - Buoncammino, near Cagliari, on soil. Leg. Canepa. (MOD. BAGLIETTO 1879: 118, as *Collema cheileum*).
 N - Seui, on a wall of siliceous boulders. Leg. E (GZU, HbWB, det. H. Schiman Czeika; TSB).
 A common and widespread soil lichen. The specimen is the typical form.
- 3 **C. cristatum** (L.) G.H. Web. var. **cristatum**
 C - Buggerru. Leg. M, E (GZU).
 N - M. Albo, on limestone. Leg. NP (GZU, TSB). - Esterzili. Leg. E (GZU).
 One of the most common and widespread species of *Collema* in Europe.
- 4 **C. cristatum** (L.) G.H. Web. var. **marginale** (Huds.) Degel.
 C - Capo S. Elia. Leg. Canepa. (MOD. BAGLIETTO 1879: 118).
 According to DEGELIUS 1954, var. *marginale* is more southern and more thermophilous than var. *cristatum*.
- 5 **C. fasciculare** (L.) G.H. Web.
 N - Rio Aratu, on *Quercus ilex*. Leg. NP (TSB).
 This species has rarely been collected in Italy (5 localities in DEGELIUS 1954). It is an oceanic lichen belonging to the omnivagous oceanic element in Europe. Our specimen was growing with other aerohygrophytic lichens, including *Lobaria amplissima*, *Polychidium umhausense*, *Nephroma laevigatum* etc.
- 6 **C. flaccidum** (Ach.) Ach.
 N - Rio Pardu. Leg. PW (GZU). - Arcu Correboi (2.5 Km N of-), on schist, 1120-1200 m. Leg. B. - M. Arbo. Leg. E (SZU).
 S - Pozzomaggiore. Leg. B.
 A suboceanic species, which in Italy is present throughout the country, but is most common in its western part, from the Lakes region in the north to Sicily (several specimens in TSB).
- 7 **C. fragrans** (Sm.) Ach.
 N - Rio Aratu, on *Pyrus*. Leg. NP (TSB).
 The collection was growing on a solitary tree in a groove along a river, with species of the *Xanthorion*.
- 8 **C. furfuraceum** (Arn.) DR.
 C - Is Pauceri, on *Quercus ilex*. Leg. NP (TSB).
 N - Between Cala Gonone and Dorgali, on *Quercus ilex*. Leg. B. - Arcu Correboi (2 Km NW of-), on *Quercus pubescens* 1130 m. Leg. B. - P.ta Palai. Leg. NP (GZU, TSB). - Rio Aratu. Leg. NP (GZU, TSB).

? - Without locality. Leg. Moris. (FI).

A suboceanic species which also commonly occurs in the mountains of the Mediterranean region.

9 **C. fuscovirens** (With.) Laund.

Syn.: *Collema tuniforme* (Ach.) Ach.

C - Sulle roccie calcaree all' Orto Botanico di Cagliari. Leg. Canepa (MOD).

A widespread and common lichen on limestone. According to DEGELIUS 1954 this species is somewhat rarer in the lowland of the Mediterranean region.

10 **C. limosum** (Ach.) Ach.

O - Buggerru, on soil. Leg. E (GZU,TSB).

A widely distributed pioneer species on recently disturbed soil.

11 **C. multipartitum** Sm.

N - M. Albo, on limestone. Leg. NP (GZU).

In Europe this species ranges from south Scandinavia to the Mediterranean region. In Italy it is known from few localities, south as far as Gran Sasso (DEGELIUS 1954:384).

12 **C. nigrescens** (Huds.) DC.

C - Gonnos Fanadiga, a Ruinas. Leg. Marcucci (FI, MOD, vidimus; also S, U according to DEGELIUS 1954:436). - M. Santo di Pula, sulle quercie. Leg. Canepa. Erbar. Critt. Ital. II 568 (FI, MOD). - Flumini Bina. Leg. Moris. (FI,MOD). - Tupa Granella, on *Quercus suber*. Leg. Tretiach (TSB).

N - Lanusei, on *Quercus ilex*. Leg. E (TSB).

Collema nigrescens is an oceanic species, occurring from coastal Scandinavia to North Africa. In Italy it occurs throughout the country, from the outer prealpine chains in the North to Sicily (several specimens in TSB).

13 **C. polycarpon** Hoffm. var. **corcyrense** (Harm.) Arn.

C - Buggerru, on limestone. Leg. E (TSB).

N - M. Albo, on limestone. Leg. NP (TSB). - Laconi. Leg. Canepa. (MOD). - P.ta Palai, river bottom, periodically submerged. Leg. NP (GZU,TSB), det. G. Degelius. - M. Arcueri, on limestone. Leg. E (TSB).

All specimens are var. *corcyrense*, which is more southern than the var. *polycarpon* (DEGELIUS 1954), and is a frequent lichen on limestone in the lowlands and lower mountains of the Mediterranean region.

14 C. rysssoleum (Tuck.) Schneid.

C - S. Lucia, on south-facing, steep surfaces of hard silicates. Leg. NP (TSB). - M. Arcuentu, on acid rock. Leg. E (GZU, HbWB, TSB). - M. Sette Fratelli, 600 m. Leg. WP, det. H. Schiman-Czeika. - Rio Is Fonsuas. Leg. Tretiach (TSB).

N - Gennargentu, Desulo, south-facing siliceous rocks. Leg. NP (GZU, TSB). - Fonni. Leg. Canepa (MOD. BAGLIETTO 1879: 119 as *Lethagrium nigrescens* b) *rupestre* Bagl.). - P.ta Palai, acid rock. Leg. NP (GZU).

S - M. Scala, 500-570 m, on granite. Leg. B.

Most European localities are from the western part of the Mediterranean Basin. In Italy the distribution of this species is also western, being confined to the Tyrrhenian coast, from Liguria to Sicily (specimens in TSB). In Sardinia the species seems to be rather widespread.

15 C. subflaccidum Degel.

Syn.: *Collema subfurvum* (Muell.Arg.) Degel.

C - Isili. Leg. Martelli (FI). - Carbonia. Leg. WP.

N - Rio Aratu, on *Pyrus*. Leg. NP (TSB).

A widespread lichen in areas with an oceanic or suboceanic climate.

16 C. subnigrescens Degel.

C - Rio Is Fonsuas on *Quercus suber*. Leg. Tretiach (TSB). - Dintorni di Capoterra. Leg. Canepa. (MOD).

N - Lanusei, on *Juglans*. Leg. E (TSB).

? - Without locality. Leg. Moris (MOD).

All specimens have the typical broad spores of *Collema subnigrescens*. This species has a range which resembles that of *C. nigrescens*, although it tends to be less confined to a strictly oceanic climate.

17 C. tenax (Sw.) Ach. var. **tenax**

C - Isola di S. Simeone and S. Bartolomeo. Leg. Canepa (MOD). - Sopra Domus Novas, nella selva. Leg. Canepa (MOD). - Tetti dell'Orto Botanico di Cagliari. Leg. Canepa (MOD). - Decimomannu. Leg. Canepa (MOD). Most specimens cited by BAGLIETTO 1879: 118, as *Collema multiflorum*. - Giba, on soil. Leg. Tretiach (TSB).

N - M. Albo, on calcareous soil in open grasslands. Leg. NP (TSB). - Arcu Correboi (2.5 Km NW of -) on epilithic mosses. Leg. B. Det. H. Schiman-Czeika. - M. Arcueri, on soil and over mosses (limestone). Leg. E (HbWB, TSB).

A very common and widespread soil lichen. The spores of most specimens were checked as part of a search for the rarer *Collema coccophorum*

which has 2-celled spores.

18 C. tenax (Sw.) Ach. var. **corallinum** (Massal.) Degel.

O - Capo Mannu, 0-53 m, on soil. Leg. B. Det. H. Schiman-Czeika.

19 C. tenax (Sw.) Ach. var. **ceranoides** (Borr.) Degel.

O - S.ta Caterina di Pittinuri, on soil in a garigue along the coast. Leg. WP, det. H. Schiman-Czeika.

35 Cornicularia

1 C. noronberica (Gunn.) DR.

N - Bruncu Spina, on acid rocks in wind-swept ridge. Leg. NP (GZU,TSB). - Gennargentu, ad rupes. Leg. Gennari (MOD, BAGLIETTO 1879: 54, as *Cornicularia tristis*). - Arcu Correboi, on gneiss. Leg. B, E (HbWB,TSB).

S - M. Limbara, on granite. Leg. E (TSB), M.

An arctic-alpine species of siliceous rocks with oceanic tendencies, in Europe spreading south to Portugal and Macedonia (SEAWARD & HITCH, 1982: 43). In Italy it extends as far south as Calabria (Sila and Aspromonte Massives, TSB), and Sicily (Madonie Mts., TSB).

36 Cyphelium

1 C. lecideinum (Nyl.) Trevis.

Syn.: *Cyphelium zahlbruckneri* G. Samp.

C - Giara di Gesturi, on siliceous rocks, on the upper part of a hole with cold air currents. Leg. NP (GZU,TSB).

N - Arcu Correboi, on rock, with *Calicium corynellum*. Leg. E (GZU).

S - Caprera. Leg. Pedicino. (MAMELI 1920:161, as *Trachylia lecideina*).

An epilithic species of siliceous rocks with a rather disjunct, mainly western distribution, see TIBELL 1971: 197.

2 C. notarissii (Tul.) Blomb. et Forss.

C - "Ad truncos erosos Quercus Ilicis in montibus Sardiniae meridionalis" (A specimen from the Herb. De Notaris seen in RO, cited by BAGLIETTO 1879:94 as *Cyphelium sardoum* has the typical spores).

S - M. della Neula, 350-415 m, on wood. Leg. B.

Includes the citation of "*Acolium tigillare*" by BAGLIETTO 1879:94 ("*Ad veteres asseres*". Herb. Moris. Specimen in MOD).

37 D a c t y l o s p o r a

1 *D. parasitica* (Flk.) Zopf

C - "Super thallum Lecanorae pallescentis in montibus Capoterra (Canepa)" (BAGLIETTO 1879:121, as *Leciographa floerkei* Massal.

N - Esterzili, on *Pertusaria* sp. growing on *Quercus ilex*. Leg. E (HbWB), det. J. Hafellner.

We have not examined the collection cited by BAGLIETTO loc. cit.; according to J. Hafellner (pers. commun.), considering the host, which is *Ochrolechia pallescens*, it ought to be *Dactylospora parasitica*.

2 *D. rimulicola* (Muell.Arg.) Hafellner

S - Altopiano di Campeda, 650 m, on *Aspicilia* sp. Leg. B., det. J. Hafellner.

Parasitic on crustose lichens. Hitherto the identification of the hosts was rather uncertain, since they were mostly sterile. In our specimen the host is fruiting and clearly belongs to *Aspicilia*.

38 D e n d r i s c o c a u l o n

1 *D. unhausense* (Auersw.) Degel.

N - P.ta Palai, on *Quercus*. Leg. NP (GZU,TSB).

This is a suboceanic species which, in Italy, is known from many localities along the Tyrrhenian coast, especially in the low montane belt, from Liguria to Calabria (several specimens in TSB).

39 D e r m a t o c a r p o n

Several of the taxa included in this genus, which is now more narrowly defined, need further studies.

1 *D. decipiens* (Massal.) DT. et S.

N - Bruncu Spina. Leg. NP (GZU,TSB), identification not certain. - Rio Pardu, in a creek. Leg. E (GZU).

S - M. Limbara. Leg. M (GZU).

2 *D. insulare* (Massal.) Mig.

N - M. Albo, on *Aspicilia*. Leg. NP (GZU, TSB).

This taxon, parasitic on species of *Aspicilia*, does not belong to *Dermatocarpon* s. str.

3 D. luridum (With.) Laund.

Syn.: *Dermatocarpon weberi* (Ach.) Mann

S - M. Limbara, on granite. Leg. E (GZU,TSB).

Although the specimens were very well developed they lack perithecia so that their identification is not completely certain. At the same site a somewhat smaller, densely lobate form occurred, which may be a different taxon.

4 D. meiophyllizum Vain.

N - P.ta Palai, in a brook. Leg. NP (GZU,TSB).

The specimens correspond quite well to the description but, as the group is still badly known, this identification is provisional.

5 D. miniatum (L.) Mann

C - Isola di S. Antioco. Leg. Feige.

N - Desulo, on rock. Leg. NP (GZU,TSB). - P.ta Palai, on rock. Leg. NP (GZU,TSB). - Sorgente Su Gologone, 100-130 m, on limestone. Leg. B.

40 *Dimelaena*

1 D. oreina (Ach.) Norm.

Syn.: *Rinodina oreina* (Ach.) Massal.

N - Arcu Correboi, on acid rock, with *Lecanora bicincta*. Leg. E (GZU,TSB).

S - Capo Orso, on granite. Leg. E (TSB), M.

This is a widespread species with a high degree of chemical diversity (see SHEARD 1974, 1977; LEUCKERT et al. 1975). Its distribution is rather remarkable since it belongs to a group of species which, in the Alps, have the highest frequency in the alpine belt, whereas they are able to grow at much lower altitudes in warm, dry areas (BUSCHARDT 1979: 145).

41 *Dimerella*

1 D. lutea (Dicks.) Trevis.

N - M. Arbo, on *Quercus ilex*. Leg. E (TSB).

An essentially pantropical species, extending into oceanic or suboceanic temperate regions in the northern hemisphere, north to western Scotland. According to SEAWARD & HITCH 1982:46 *Dimerella lutea* is an indicator of sites with a long history of ecological continuity,

occurring on bark or siliceous rock in consistently humid and somewhat shaded situations. Recent finds in Italy are from the Trieste Karst in the northeast and from the coast of Latium (TSB). The species is on the way of extinction in many parts of Europe.

42 *Diploicia*

1 *D. canescens* (Dicks.) Massal.

Syn.: *Buellia canescens* (Dicks.) Massal.

C - "Haud rara atque fructifera ad trabes superque corticem Amygdali, Cagliari et finitimis (Gennari, Canepa), prope Iglesias (Canepa)" (Several specimens in MOD. BAGLIETTO 1979:95). - "Isolotto dello Stagno di Cagliari" Leg. De Notaris (DE NOTARIS 1846: 197). - Cagliari, on *Sophora* in the Botanical Garden (COLOSI 1917:469). - Isola di S. Antioco. Leg. Brizzi (TSB).

N - Rio Aratu, on *Pyrus*. Leg. NP (GZU,TSB). - Desulo, on rock. Leg. NP (TSB). - M. Mannu, on rock. Leg. NP (TSB). - Rio Pardu. Leg. E (GZU). - Capo Pecora, on granite. Leg. E (TSB).

S - P.ta Falcone, on *Juniperus*. Leg. NP (GZU,TSB). - *ibid.*, on schist. Leg. Pertot (TSB). - Stintino, epiphytic (*Juniperus*) and epilithic. Leg. B, WP. - S. Teresa di Gallura, on granite. Leg. M, E (HbWB,GZU,TSB). - Capo d' Orso, on granite. Leg. E (GZU,TSB). - M. Limbara. Leg. E (GZU). - "Ad *Juniperos* in insula Caprera (Gennari): minus frequens sterilisque ad rupes". (BAGLIETTO 1879:95). - M. Russu. Leg. E (SZU).

A suboceanic species in Europe with a wide world distribution which extends to the southern hemisphere. In Italy particularly common along the Tyrrhenian coast in the lowlands, present also in the outskirts of Rome, rarer along the Adriatic coast, south up to Sicily (specimens in TSB). The specimens on rock along the coast are stouter and larger than those on trees, and perhaps might be eventually considered as a distinct taxon.

2 *D. subcanescens* (R.G. Werner) Hafellner et Poelt

Syn.: *Buellia subcanescens* R.G. Werner

C - Isola dei Cavoli, on acid rock near the sea. Leg. NP (GZU, TSB).

S - P.ta Falcone, on acid rock. Leg. NP (GZU,TSB) - S. Teresa di Gallura, on granite near the harbour. Leg. E (GZU,HbWB,TSB), M. - Capo d'Orso. Leg. E (GZU).

A western littoral species, previously known from Spain, Portugal and southern France (LLIMONA et al. 1976; ROUX 1977:91, as *Buellia subcanescens*). In Sardinia it was always on acid rock near the sea,

often with the previous species.

43 Diploschistes

The genus *Diploschistes* is currently under revision; we use the names used by collectors. Besides the taxa cited below, MAMELI 1920: 169 cites also "*Urceolaria scruposa* Ach. var. *iridata* Massal." (Busachi, on trachytic rocks), and "*Urceolaria actinostoma* (Pers.) var. *trachytica* Massal.". We have not been able to check these identifications.

1 *D. actinostomus* (Ach.) Zahlbr. var. *actinostomus*

C - Giara di Gesturi. Leg. NP (GZU,TSB). - Below P.ta Serpeddi'. Leg. NP (GZU). - M. Sette Fratelli. Leg. WP (W,SZU). - "Ad rupes granitoideas iuxta Capoterra (Canepa), ad basaltes in monte Cepera prope Guspis (Marcucci)". (The specimen from Capoterra is in MOD. BAGLIETTO 1879:117, as *Limboria actinostoma*).

A very variable species of southern and western Europe (LETTAU 1937: 93), also present in the central Alps (Vinschgau, BUSCHARDT 1979: 150).

2 *D. actinostomus* var. *caesioplumbeus* (Nyl.) Steiner

C - M. Sette Fratelli, 600 m, on granite. Leg. WP.

S - M. Russu. Leg. E (HbWB, TSB).

According to SEAWARD & HITCH 1982:48, this taxon, which is at least nearly allied to var. *actinostomus*, is exclusively maritime in western Britain, where it grows on hard, siliceous rocks on moderately sheltered but sunny shores. In the Mediterranean region it can be found also on low coastal mountains. Also known from France and the Iberian Peninsula.

3 *D. bisporus* (Bagl.) Steiner

C - Giara di Gesturi. Leg. NP (GZU,TSB). - P.ta Serpeddi'. Leg. NP (GZU,TSB). - S. Pantaleo. Leg. Tretiach (TSB).

N - Arcu Correboi. Leg. B. - Altopiano di Campeda, on basaltic lava. Leg. B. - Rio Pardu. Leg. E (GZU). - Desulo. Leg. NP (TSB).

S - P.so La Variante. Leg. E (GZU), M.- M. Limbara, on granite. Leg. E (HbWB,TSB).

This otherwise rare, but very distinctive species, is not uncommon in Sardinia where it has been collected from the coast to the mountains.

4 *D. euganus* (Massal.) Steiner

C - Capo Pecora, on wheathered granitic rocks near the sea, with *Acarospora microcarpa*. Leg. E (HbWB,GZU).

S - Capo d' Orso. Leg. M. - Tavolara. Leg. Brizzi (TSB).

This comparatively inconspicuous lichen has probably been often overlooked.

5 **D. gypsaceus** (Ach.) Zahlbr.

N - M. Albo, on a steeply inclined, north-facing limestone rock, in a fissure. Leg. NP (TSB).

6 **D. interpediens** (Nyl.) Zahlbr.

C - Is Paucerus. Leg. NP (GZU, TSB).

N - Rio Pardu. Leg. WP (GZU).

7 **D. muscorum** (Scop.) R. Santesson

Syn.: *Diploschistes bryophilus* (Ehrh.) Zahlbr.

C - Is Paucerus. Leg. NP (TSB). - Road Arbus-Buggerru, on soil. Leg. E (TSB). - Promontorio S. Elia, on mosses. Leg. Gennari. (MOD. BAGLIETTO 1879:86). - Tupa Granella. Leg. Tretiach (TSB).

N - M. Albo, on epigaeic mosses (calcareous soil). Leg. NP (TSB). - Aggius (2 Km NNE from -). Leg. W. - Seui. Leg. M. - Rio Pardu, on *Cladonia*. Leg. E (GZU). - Isili (COLOSI 1917:468). - M. Arcueri. Leg. E (TSB), M. - Supramonte di Oliena. Leg. W.

S - Capo d' Orso. Leg. M. - Aggius. Leg. W. - "Parasita *Cladoniae alpicornis* in insula Caprera". Leg. Gestro. (MOD. BAGLIETTO 1879:86). - Tavolara. Leg. Brizzi (TSB).

This lichen is parasitic on *Cladonia*-species, at least in its early stage of development (see FRIEDL 1987).

8 **D. ocellatus** (Vill.) Norm.

C - M. Sette Fratelli, on limestone. Leg. Gennari. (BAGLIETTO 1879:85, as *Urceolaria ocellata*); we have not seen this specimen, but probably the identification is not correct, as BAGLIETTO adds that "thallus neque Hydr. Kal. neque Hypocl. calc. colorem mutat").

N - Esterzili. Leg. M. - M. Albo, in fissures of calcareous rocks. Leg. NP (GZU, TSB). - Grotta Su Marmuri, on limestone. Leg. B.

A southern species in Europe from the Alps (BUSCHARDT 1979:150) to Macaronesia (LETTAU 1937). Its entire range extends through North Africa to the Irano-Turanian region. A record by COLOSI 1917: 468, from Isili, on schist, has not been checked.

9 **D. scruposus** (Schreb.) Norm.

C - S. Pantaleo. Leg. Tretiach (TSB). - Rio Alino. Leg. Tretiach (TSB).

N - Seui, on acid rock. Leg. E (TSB), M. - Rio Pardu. Leg. E (GZU).

- 10 **D. scruposus** (Schreb.) Norm. v. **arenarius** (Schaer.) Muell. Arg.
S - Aggius, on earth. Leg. B.
- 11 **D. scruposus** (Schreb.) Norm. v. **violarius** (Nyl.) Lett.
C - M. Arcuentu. Leg. E (GZU).
N - Lanusei, on granite. Leg. E (TSB).
- 12 **D. steppicus** Reichert
C - Capo Sandalo. Leg. Feige.
O - Capo Mannu, on soil. Leg. Feige.

44 *Dirina*

For further details on the distribution and ecology of the species of this genus, see TEHLER 1983.

- 1 **D. ceratoniae** (Ach.) Fr.
C - Cagliari, surroundings. Leg. Gennari (MOD). - Cagliari, on Ceratonia (COLOSI 1917:468). - Pula. Leg. Gennari (MOD).
S - Alghero, on Quercus ilex. Leg. Pertot (TSB). - Tavolara, on Quercus ilex. Leg. Brizzi (TSB).

The two specimens are cited by BAGLIETTO 1879: 81. A third locality is Tortoly (sic) Leg. Marcucci, for which no specimen was found in MOD.

- 2 **D. massiliensis** Dur. et Mont.

Syn.: *Dirina repanda* auct.

- C - Cagliari, surroundings, on limestone. Leg. Canepa (MOD). Capo Carbonara. Leg. Gennari (MOD. BAGLIETTO 1879: 81 as *Dirina repanda*).
N - Between Cala Gonone and Dorgali, on limestone, 0-100 m. Leg. B.
S - Capo Caccia, steeply inclined calcareous rocks. Leg. NP (GZU, TSB). - P.ta Falcone, on acid rock. Leg. NP (GZU, TSB). - S. Teresa di Gallura, on granite. Leg. E (GZU, HbWB, TSB). - Capo d'Orso. Leg. M, E (GZU, TSB). - M. Russu. Leg. E (GZU, SZU).

The species seems to be fairly common on coastal rocks around the island. Specimens collected on siliceous rocks could be referred to *Dirina patronii* Bagl., which, however, is no more than a dark-coloured form of *Dirina massiliensis*. This form may owe its darkened thallus to the iron-rich substrata on which it grows.

- 3 **D. stenhammari** (Fr.) Poelt et Follmann

Syn.: *Lecanactis stenhammari* (Fr.) Arn.

- N - M. Albo, on limestone. Leg. NP (GZU, TSB). - M. Arcueri, on

north-facing, steeply inclined rocks. Leg.M, E (GZU,TSB).
Of the European Dirinas, this species spreads furthest north in Europe (to south Scandinavia, POELT & FOLLMANN 1968). Regarding the taxonomy of this lichen, we do not follow TEHLER (1983) in considering it to be a form of *Dirina massiliensis*; this probably non-homogeneous taxon is widespread widely beyond the range of *Dirina massiliensis*, and has presumably been phylogenetically independent for a very long time.

45 *Echinothecium*

1 *E. reticulatum* Zopf

N - Rio Madau, on *Parmelia conspersa*. Leg. W.

Similar fungi with epiphytic mycelium were observed on different lichens. The taxonomy of all these forms is not yet clear.

46 *Endocarpon*

Endocarpon is one of the most poorly understood genera of the entire European lichen flora, most identifications are doubtfully correct.

1 *E. pallidum* Ach.

C - Orri. Leg. Canepa (BAGLIETTO 1879:112-113 as *Dermatocarpon pallidum*).

We have not seen this specimen.

2 *E. pusillum* Hedw. s. lat.

N - Desulo, on soil. Leg. NP (TSB).

The squamules have a dark lower surface, the spores are brown at maturity and measure ca. 35 x 15 μ m.

47 *Endococcus*

For this genus of lichenicolous fungi, see HAWKSWORTH 1979.

1 *E. rugulosus* Nyl.

C - M. Sette Fratelli, 600 m, on *Aspicilia* sp. Leg. WP. - Below P.ta Serpeddi', on *Lecidea* sp. Leg. NP (GZU).

N - Arcu Correboi. Leg. M. - Rio Pardu, on *Acarospora sphaerospora*.

S - Aggiu (2 Km NNW from -). Leg. W. - M. Limbara. Leg. M.

For the distribution and ecology of this species, see HAWKSWORTH

1979:287.

2 **E. stigma** (Koerb.) Stitzenb.

C - M. Arcuentu, on *Rhizocarpon geographicum* s. lat. Leg. E (GZU). -
P.ta Serpeddi', on *Rhizocarpon geographicum* s.lat. besides
Rhizocarpon fraticida. Leg. NP (GZU).

S - M. Limbara, on *Rhizocarpon* sp., with *Muellerella lichenicola* on
Lecanora intricata. Leg. E (GZU).

48 **E n t e r o g r a p h a**

1 **E. crassa** (DC.) Fée

N - Lanusei, on an old oak, with *Schismatomma decolorans*. Leg. E (TSB).
A western species whose distribution in Italy is centered along the
Tyrrhenian coast, from Liguria to south Latium (TSB), where it grows
on broadleaved trees (often *Quercus ilex*) in stands with rather high
air humidity, often with *Arthonia tumidula*, *Pyrenula chlorospila* and
Schismatomma decolorans (see NIMIS & SCHIAVON 1986).

2 **E. sp.**

N - M. Arcueri, steep side of calcareous rock. Leg. E (GZU).
Possibly identical to an undescribed taxon from Mallorca.

49 **E p h e b e**

1 **E. lanata** (L.) Vain.

S - M. Limbara, on granite. Leg. E (GZU).

50 **E v e r n i a**

The report of *Evernia thamnodes* Fw. (= *E. mesomorpha* Nyl.) by MAMELI 1920:
162, from three localities (Paulilatino, Busachi, and Giave), below 500 m is
certainly due to an error of identification.

1 **E. divaricata** (L.) Ach.

? - "Ex Sardinia" (MOD).

This is probably the specimen from the herbarium Moris cited by
BAGLIETTO 1879:59 ("Ad arbores in sylvis" Moris: non vidi."). Until
now, in Italy the species is known from the north and the Apennines,
south to Calabria (Sila), always in the montane vegetation belt.

2 *E. prunastri* (L.) Ach.

- C - Is Pauceris, on *Quercus suber*. Leg. NP (TSB). - Below P.ta Serpeddi', on *Quercus ilex*. Leg. NP (TSB). - Giara di Gesturi, on *Quercus suber*. Leg. NP (TSB). - Arcu Genna Bogai, on *Quercus suber*. Leg. B. - M. Sette Fratelli. Leg. Gennari (MOD). - "Fructifera, at parce, in sylvaticis supra Orri". Leg. Canepa (MOD). - M. Sette Fratelli. Leg. Gennari (MOD). - "Prope Iglesias (De Not.)." (BAGLIETTO 1879:59) - Orri, with apothecia (COLOSI 1917: 460) - M. Maxias. Leg. Tretiach (TSB).
- N - S'Arcu de Tascussi, on *Quercus*. Leg. NP (TSB). - Bruncu Spina, on *Alnus*. Leg. NP (GZU). - P.ta Palai, on *Acer*. Leg. NP (GZU,TSB) - ibid., on *Quercus pubescens* Leg. B. - M. Arcueri. Leg. M, E (GZU,TSB). - M. Arbo. Leg. E (HbWB,SZU,TSB). - Aritzo. Leg. Gennari (MOD. BAGLIETTO 1879:59). - Arcu Correboi. Leg. E (SZU). - Tonara, Isili (COLOSI 1917:460). - M. Ortobene. Leg. Pertot (TSB). - Badde Orca. Leg. Pertot (TSB).
- O - M. Ferru, on *Quercus ilex*. Leg. B, Feige. - Cuglieri (7 Km ENE of-), on *Quercus ilex*. Leg. WP. - Giara di Gesturi (2 Km S of Assolo), 450 m, on *Quercus pubescens*. Leg. WP. - Nuraghe Losa. Leg. Feige.
- S - P.so La Variante, on *Quercus suber*, with a few apothecia. Leg. E (GZU, HbWB,SZU,TSB). - M. Limbara. Leg. E (SZU). - Nuraghe Loelle. Leg. Pertot (TSB).

Evernia prunastri is one of the commonest epiphytic fruticose lichens throughout Italy, ranging from the lowlands to the montane and even subalpine vegetation belts.

51 *Fulgensia*

1 *F. desertorum* (Tomin) Poelt

- O - Capo Mannu. Leg. Feige.

This species ranges from the semi-deserts of Central Asia to the Mediterranean region and Macaronesia, with outliers in xeric, climatically continental sites in the central Alps, in central Norway and in east Greenland. In Italy it is also known from Liguria (Alassio, POELT 1965: 600-601).

2 *F. fulgida* (Nyl.) Szat.

- C - Cagliari, Promontorio S. Elia. (MOD, (BAGLIETTO 1879: 69, as *Placidium fulgens*). Other localities in the Province of Cagliari, cited by BAGLIETTO are: Domusnovas, Isola di San Pietro (Leg.

Moris), and Iglesias, Isola S. Simone (Leg. Canepa). We could not check the relative specimens.

- N - Seui. Leg. M, E (GZU, HbWB). - M. Albo, on calcareous soils and in limestone cracks. Leg. NP (GZU, TSB). - Supramonte di Oliena. Leg. W. - Grotta Su Marmuri, 900 m, on soil. Leg. B.

This species has an eumediterranean distribution. It has been frequently confused with the rather similar *Fulgensia fulgens*, which is rare in the Mediterranean area, and mostly occurs on gypsum soils in areas with more or less submediterranean conditions.

3 *F. schistidii* (Anzi) Poelt

- N - Arcu Correboi, on moss. Leg. B. - M. Arcueri. Leg. E (TSB).

This species grows on epilithic mosses on calcareous rock; it is most frequent in the montane and subalpine belts of south European mountains, including the Alps, to Macaronesia (a collection from Tenerife, 2200 m, TSB). Distribution map (very outdated) in POELT (1965: 585)

4 *F. subbracteata* (Nyl.) Poelt

Syn.: *Lecanora subbracteata* Nyl.; *Caloplaca subbracteata* (Nyl.) Lett.

- N - Arcu Correboi, on soil. Leg. B.

- O - Capo Mannu, on moss and soil in fissures of sandstone. Leg. B.

- S - Anghelu Ruju, on soil. leg. W. - ibid. Leg. Pertot (TSB).

A species of loamy soils, from Macaronesia to the submediterranean region. It appears to be absent in central Europe north of the Alps (POELT ET VEZDA 1977: 113). In Italy it is known from several localities from Liguria to Calabria and Sicily. The specimens from Sardinia tend to be abundantly fertile with few schizidia.

52 *F u s c i d e a*

1 *F. tenebrica* (Nyl.) Wirth et Vežda

- C - P.ta Serpeddi', on acid rock. Leg. NP (GZU, TSB).

- S - M. Limbara, steep sides of granitic boulders. Leg. E (GZU, TSB).

The identity of the specimens is not completely certain. The taxonomy and the nomenclature of this species are currently confused.

2 *F. sp.*

- S - M. Limbara. Leg. E (GZU).

A sorediate specimen with globose apothecia and conspicuous rounded whitish soralia; no reactions with K, C, P.

53 *Gonohymenia*

1 *G. nigritella* (Lettau) Henssen

Syn.: *Thyrea nigritella* Lettau

C - M. Arcuentu, on non-calcareous rock. Leg. E (GZU, SZU, TSB).

54 *Gorgadesia*

1 *G. mira* C. Tav.

C - Capo Caccia, on limestone, sterile. Leg. NP (GZU, TSB).

The lichen was growing in a deep crevice of a north-facing rock surface. We collected a few, fruticose, very brittle, sterile thalli, clearly differing from those of a *Roccella*. The material was sent to G. Feige for chemical analysis. He found a chemistry that was very different from that of *Roccella*, and it became clear that our lichen does not belong to this genus. Our material, however, corresponds well to the description of *Gorgadesia mira* of TAVARES 1964 from Capo Verde. This lichen should be carefully looked for in fruiting condition; it probably grows normally in inaccessible stations.

55 *Gyalecta*

1 *G. jenensis* (Batsch) Zahlbr.

C - "Ad rupes umbrosas in monte Santo Pula". Leg. Gennari. (MOD. BAGLIETTO 1879:87, as *G. cupularis*).

2 *G. leucaspis* (Krempelh.) Zahlbr.

N - M. Arcueri. Leg. E (SZU).

3 *G. truncigena* (Ach.) Hepp

N - M. Arbo. Leg. E (SZU).

4 *G. ulmi* (Sw.) Zahlbr.

C - In sylvis montis Sette Fratelli". Leg. Gennari. (MOD. BAGLIETTO 1879:87, as *Phialopsis rubra*).

N - M. Albo, on mosses over calcareous soil. Leg. NP (GZU, TSB) - M. Arcueri, on epilithic mosses on subvertical calcareous rocks. Leg. E (GZU, HbWB, TSB).

A rather rare, mostly corticolous, species, with a wide, but scattered, range north to Iceland, east to the Caucasus. Our specimens were on

epilithic mosses or on limestone but were otherwise quite typical.

56 Haematomma

1 *H. ochroleucum* (Neck.) Laund. var. *ochroleucum*

C - Tupa Granella, epiphytic. Leg. Tretiach (TSB).

S - P.so La Variante, on granite, always close to a creek. Leg. E (TSB).

This species, occurring both on bark and acid rock, is confined to very humid sites.

2 *H. ochroleucum* var. *porphyrium* (Pers.) Neck.

N - P.ta Palai, on porphyric rock, with abundant apothecia. Leg. NP (GZU,TSB), B. Also cited by BAGLIETTO 1879: 81 from "Sardinia Centralis".

3 *H. ventosum* (L.) Massal.

N - Bruncu Spina, on acid rock. Leg. NP (GZU,TSB). - P.ta Paulinu, on acid rock. Leg. NP (TSB). - Gennargentu (BAGLIETTO 1879:81).

A European species, occurring throughout most of Scandinavia, Britain, the Alps, Carpathians and Pyrenees. The southernmost locality in Italy is from Calabria (Aspromonte, TSB). In Sardinia this lichen is restricted to the highest peaks of the Gennargentu Massive.

57 Hafellia

For the recently described genus *Hafellia* Kalb, Mayrhofer et Scheidegger, see KALB, Schedae ad Lichenes Neotropici, Nr. 372. The identifications are by C. Scheidegger.

1 *H. leptoclinoides* (Nyl.) Scheidegger et Mayrh.

Syn.: *Buellia leptoclinoides* (Nyl.) Steiner

N - Torre Argentina. Leg NP (GZU,TSB).

S - S. Teresa di Gallura. Leg. M, E (TSB).- Capo d' Orso. Leg. E (GZU).

58 Heterodermia

1 *H. obscurata* (Nyl.) Trevis.

S - Tavolara on *Quercus ilex*. Leg. Brizzi (TSB).

This species has a western distribution pattern in Italy; it is most frequent on isolated wayside trees along the Tyrrhenian coast from Liguria to Campania (several specimens in TSB); it mostly occurs below the montane belt.

2 *H. speciosa* (Wulf.) Trevis.

C - Rio Alino, on *Quercus suber*. Leg. Tretiach (TSB).

Heterodermia speciosa is less thermophytic than *Heterodermia obscurata*: in Mediterranean Italy it is most frequent in montane beechwoods from the north to Sicily.

59 *Hymenelia*

1 *H. prevostii* (Fr.) Koerb.

C - "Ad saxa calcarea prope Cagliari". Leg. Gennari (BAGLIETTO 1879:88). We have not seen the specimen.

2 *H. similis* (Massal.) Poelt et Veřda

Syn.: *Pinacisca similis* Massal.; *Lecanora similis* (Massal.) Nyl.

N - M. Albo, on a North exposed, subvertical limestone rock. Leg. NP (GZU,TSB). - M. Arcueri, on limestone. Leg. E (GZU,TSB).

The distribution of this rarely collected lichen is poorly known. It is known from the southern Alps and the Mediterranean mountains where it seems to be rare.

3 *H. sp.*

C - Is Pauceris, on hard siliceous rocks. Leg NP (GZU,TSB).

60 *Hyperphyscia*

1 *H. adglutinata* (Flk.) Mayrh. et Poelt

Syn.: *Physciopsis adglutinata* (Flk.) Choisy; *Physcia elaeina* auct.

C - M. Santo di Pula, on *Cupressus*. Leg. Canepa. (MOD. BAGLIETTO 1879:62, as *Hagenia elaeina* var. *adglutinata*). - Road Arbus - Buggerru, on *Quercus suber*. Leg. E (GZU).

N - Esterzili. Leg. E (GZU). - Lanusei, on orchard trees. Leg. E (GZU,TSB).

Hyperphyscia adglutinata has a subatlantic range in Europe. In Italy it is rather common throughout the country, mostly below 800 m, and most frequently on the boles of isolated trees near human settlements or along roads.

61 *Hypogymnia*

1 *H. physodes* (L.) Nyl.

C - Is Pauceri, on *Quercus suber*. Leg. NP (TSB). - Gennamari, near Iglesias. Leg. Gennari (MOD. BAGLIETTO 1879:63).

N - M. Ortobene, on *Pinus*. Leg. NP (TSB). - P.ta Palai, on epilithic mosses. Leg. B. - Arcu Correboi. Leg. E (SZU). - Tonara (COLOSI 1917: 464).

S - P.so La Variante, on *Quercus suber*, with apothecia. Leg. E (GZU). - M. Limbara. Leg. E (SZU).

A very common species throughout Italy, from the lowlands (rare in the south) to the subalpine belt.

2 *H. tubulosa* (Schaer.) Havaas

C - Tupa Granella. Leg. Tretiach (TSB).

N - P.ta Palai, on *Quercus* Leg. NP (TSB), and porphyric rock (Leg.B). - Rio Aratu, on *Castanea*. Leg. NP (TSB). - M. Arbo. Leg. E (SZU,TSB), M.

O - M. Ferru, with *Parmelia saxatilis*. Leg. W. - ibid., 600 m, on *Quercus ilex*. Leg. B, Feige.

S - M. Limbara. Leg. E (HbWB,SZU,TSB), M. - P.so La Variante. Leg. E (HbWB).

More hygrophytic than the previous species, and in Italy most frequent throughout the country in the montane vegetation belt.

62 *Ionaspis*

1 *I. epulotica* (Ach.) Th. Fr.

N - M. Albo, north-facing calcareous rock. Leg. NP (GZU,TSB).

This species is very common in the calcareous Alps. Its distribution in the Mediterranean mountains is poorly known.

63 *Karschia*

For the taxonomy of this for a long time misunderstood genus see HAFELLNER 1979:178. Most specimens have been identified by J. Hafellner.

1 *K. taloophila* (Ach. ex Flot.) Koerb.

C - Giara di Gesturi. Leg. NP (GZU).

N - Rio Pardu. Leg. E (GZU).

S - M. Limbara. Leg. M.

This species, thought to be rare everywhere within its range, seems to be comparatively frequent Sardinia. All our specimens were parasitic on *Diploschistes bisporus*.

2 ***K. talcophila* var. *irregularis* Vouaux'**

C – Costa Verde, on apothecia of *Pertusaria pertusa* growing on *Juniperus macrocarpa*. Leg. B. Det. Hafellner.

S – S. Teresa di Gallura, on *Pertusaria*. Leg. E (GZU).

This taxon, which does not belong to *Karschia* s. str., seems to be a good species, but its taxonomic status still needs study. It is widespread in more or less coastal environments of Europe and Macaronesia. According to J. Hafellner (pers. comm.) this lichenicolous fungus has a very broad distribution pattern, being also known from Australia.

64 *K i l i a s i a*

The genus *Kiliasia* was described by HAFELLNER 1984:261. It includes lichenized species which were considered earlier to belong to *Catillaria*, as well as the lichenicolous fungus, *Catillaria episema*, previously included in *Scutula*, which is a widespread species in Europe, but has been seldom collected.

1 ***K. episema* (Nyl.) Hafellner**

N – Between Cala Gonone and Dorgali, on *Aspicilia calcarea*. Leg. W (GZU). Det. Hafellner. – Esterzili, on *Aspicilia calcarea*. Leg. M. A lichenicolous fungus of the "*Catillaria athallina*" group, which is relatively frequent on species of the *Aspicilia calcarea* complex in the Mediterranean and submediterranean areas.

2 ***K. philippea* (Mont.) Hafellner**

S – M. Mannu. Leg. NP (GZU).

65 *K o e r b e r a*

1 ***K. bifomis* Massal.**

C – Is Pauceriis, on *Pyrus*. Leg. NP (GZU,TSB).

N – Lanusei, on *Pyrus*. Leg. E (TSB). – M. Albo, on *Quercus ilex*. Leg. NP (TSB).

O – Budduso', on *Quercus* (COLOSI 1917:471).

66 Lasallia

1 *L. brigantium* (Zsch.) Llano s.str.

N - Torre Argentina, on rock. Leg. NP (GZU,TSB).

This lichen was until now only known from the island of Corsica. FREY 1949:443 described a var. *hispanica*, which differs in several characters and which has been recently elevated to species rank as *Lasallia hispanica* (Frey) Sancho et Crespo, in SANCHO 1986:121. *Lasallia hispanica* has a much larger distribution area than *Lasallia brigantium*, being known from Spain, Portugal, northern Morocco (see SANCHO loc.cit.); it was also collected in southern Italy (Calabria, Leg. CODOGNO et PUNTILLO, TSB).

2 *L. pustulata* (L.) Merat

C - Below P.ta Serpeddi', on acid rock in wind swept ridge. Leg. NP (TSB). - M. Linas, on Vulcanite, 1000 m. Leg. Feige. - Teulada, on granite, 100 m. Leg. Feige. - Villacidro, 370 m, vertical acid rocks. Leg. WP. - Orri. Leg. Canepa (MOD, BAGLIETTO 1879:94).

N - Rio Pardu. Leg. E (GZU). - M. Ortobene. Leg. NP (GZU,TSB). - P.ta Palai, on acid rock. Leg. NP (TSB), B. - P.ta Paulinu, on acid rock, north-facing steep rocks. Leg. NP (TSB). - Arcu Correboi. Leg. B, E (HbWB, SZU, TSB), M. - Villanova Strisaili. Leg. B. - Bruncu Spina, 1200 m. Leg. Feige. - Isili (COLOSI 1917:463).

O - M. Ferru, 700-725 m. Leg. B, Feige. - Budduso' (COLOSI 1917:463).

S - Altopiano di Campeda. Leg. B. - Capo Testa, on granite, 40 m. Leg. Feige. - Between Tempio and Palau, 200 m, on granite. Leg. Feige. - Villanova Monteleone, on granite. Leg. Feige. - M. della Neula, 350-415 m, on granite. Leg. B. - M. Limbara. Leg. E (GZU, SZU, TSB). - Palau. Leg. F. Ceni (TSB). - P.so La Variante. Leg. E (SZU).

The species appears to be quite common in suitable habitats from sea level to the peaks of the Gennargentu Massive.

67 Lecanactis

1 *L. grumulosa* Fr.

Syn.: *Opegrapha grumulosa* Duf.

C - Cagliari and surroundings, with *Dirina repanda*. (MOD, BAGLIETTO 1879: 107, as *Lecanactis grumulosa* b) *platycarpa*).

S - Capo Caccia, in niches of calcareous rocks, with *Dirina massiliensis*. Leg. NP (GZU,TSB).

A rather frequent lichen throughout the Mediterranean region, on

steeply inclined, more or less north-facing coastal calcareous rocks, often associated with *Rocella* species and *Dirina massiliensis*.

2 *L. monstrosa* Bagl.

C - Giara di Gesturi, on acid rock. Leg. NP (GZU, TSB).

S - P.ta Falcone, on acid rock. Leg. NP (TSB) - *ibid.*, on *Juniperus*. Leg. NP (TSB).

68 *L e c a n i a*

The collections of saxicolous species have been revised by M. Mayrhofer, who is preparing a monograph on the epilithic *Lecanias* in Europe. The taxonomy of the corticolous species is often confused, and also needs a monographic treatment.

1 *L. aipospila* (Wahlenb.) Th.Fr. s. lat.

S - P.ta Falcone, on acid rock. Leg. E (GZU), W.

This is an Atlantic species; the specimen is not well developed, but anyway it is not identical to material from northwestern Europe. A similar lichen exists on the coast of Baja California.

2 *L. atrynoides* Knowles

S - Stintino, on phyllitic rock. Leg. B. - P.ta Falcone, on micaschist. Leg. NP (GZU, TSB), W.

In some collections at least this species commences its development as a parasite of *Caloplaca* sp. (in the area mostly *Caloplaca ora*).

3 *L. cyrtella* (Ach.) Th.Fr.

C - Portixeddu, on *Acacia* sp. Leg. E (HbWB, TSB). - *ibid.*, on *Pinus*. Leg. E (GZU). - " In cortice *Thymi* et *Solani sodomaei*, ad parietes ligneas pontium della Scaffa prope Cagliari (Gennari, Canepa Marcucci) (BAGLIETTO 1879:106, as *Biatorina cyrtella*).

N - M. Ortobene, on *Populus*. Leg. NP (GZU, TSB). - Arcu Correboi (2 Km NW of-), on *Quercus pubescens*, 1120-1200 m. Leg. B.

O - Stagno di Cabras, on *Opuntia*, 3-5 m. Leg. B.

S - Badesi Mare, on *Juniperus*. Leg. E (TSB). - Tempio Pausania, on *Ulmus*. Leg. E (TSB).

The species is clearly rather common on nutrient-rich bark in Sardinia.

4 *L. cyrtellina* (Nyl.) Sandst.

N - Seui, on *Ulmus*, with *L. fuscella*. Leg. E (GZU). - M. Arcueri. Leg. E (GZU). - M. Albo. Leg. E (OGZU).

- 5 **L. fuscella** (Schaer.) Koerb.
N - Seui, on *Ulmus*, with the previous species. Leg. E (GZU,TSB).
- 6 **L. inundata** (Hepp ex Koerb.) M. Mayrhofer comb. nov.
Basion.: *Biatorina inundata* Hepp ex KOERBER 1860:145 = *Lecania erysibe* var. *inundata* (Hepp ex Koerb.) ZAHLBRUCKNER 1928: 729.
Typus: Deutschland, Baden-Württemberg: Heidelberg, an Granitblocken im Neckar, Ahles (L: Holotypus).
C - Capo Pecora. Leg. M.
N - Esterzili. Leg. M.
This species, known under several different names, is widespread in central and southern Europe.
- 7 **L. nylanderiana** Massal.
N - M. Arcueri, on steeply inclined limestone rock faces. Leg. E (GZU,TSB).
The true *Lecania nylanderiana* is much rarer than hitherto assumed. Most of the collections identified as *Lecania nylanderiana* belong to *Lecania suavis*.
- 8 **L. olivacella** (Nyl.) Zahlbr.
O - Capo Mannu, on limestone. Leg. B.
S - P.ta Falcone. Leg. W.
This is a rarely collected species, with a very incompletely known distribution.
- 9 **L. rabenhorstii** (Hepp) Arnold
N - Supramonte di Oliena, on limestone. Leg. W.
- 10 **L. spadicea** (Flot.) Zahlbr.
C - Baia Chia. Leg. P (GZU,TSB). - Cagliari, on walls. Leg. Canepa (ARNOLD, Lich. exs. 1679). - Cagliari, on limestone. Leg. Gennari et Canepa (MOD). - "Prope Carolam" Leg. Canepa (UPS, BM: RABENHORST: Lich. Europ. 789).
Lecania spadicea is an eumediterranean species known from several other localities in southern Italy.
- 11 **L. suavis** (Muell. Arg.) Migula
N - M. Arcueri, on limestone. Leg. E (GZU).
This appears to be a temperate species which has been often wrongly identified as *Lecania nylanderiana*. In the Mediterranean region it seems to be confined to mountain areas.

12 L. sylvestris (Arnold) Arnold var. **sylvestris**

C - Buggerru, on limestone. Leg. M.

N - M. Arcueri, on limestone. Leg. E (GZU).

The two varieties of *Lecania sylvestris* are easily distinguished, but, since only a few specimens are known, their ranges cannot yet be specified. See also note on the following taxon.

13 L. sylvestris var. **umbratica** (Arnold) M. Mayrhofer comb. nov.

Basionym : *Biatorina proteiformis* f. *umbratica* Arnold 1874:569. =
Lecanora erysibe f. *umbratica* (Arnold) Nylander 1881: 538 =
Lecania erysibe f. *umbratica* (Arnold) Zahlbruckner 1928:728.

Typus : Arnold: Lich. exs. 597a (M - Holotypus). Deutschland: Bayern: an einer beschatteten Dolomitwand der Anlagen zu Eichstaett; 19.4.1874. Leg. F. Arnold.

Exicc. : Arnold: Lich. exs. 597 a, b (M).

The variety *umbratica* is distinguished from var. *sylvestris* by the following characters: thallus endolithic or composed of scattered granules; apothecia smaller (0.3-0.4 mm), a little convex and without margin. The parathecium is less developed and the thalline margin contains only a few algae. The number of paraphyses is relatively small, about the same as the number of asci. The variety is widespread on limestone in central and southern Europe.

C - Buggerru, on limestone. Leg. E (TSB), M.

O - Capo Mannu, on limestone. Leg. B.

14 L. turicensis (Hepp) Muell. Arg.

C - Capo Pecora on acid rock. Leg. M. - Baia Chia, on calcareous rock. Leg. NP (GZU, TSB). - Buggerru, on limestone near the coast. Leg. E (GZU). - Barumini on calcareous sandstone. Leg. E (GZU,TSB). - "Ad rupes calcareas Cagliari et ad muros circum Orri (Canepa)". (BAGLIETTO 1879:106, as *Biatorina turicensis*; we have not seen the specimens).

N - M. Albo on limestone. Leg. NP (GZU). - Esterzili on limestone. Leg. M. - Between Dorgali and Cala Gonone. Leg. W. - M. Arcueri, on limestone. Leg. M, E (GZU,TSB).

O - Capo Mannu, on limestone and calcareous sandstone, 0-60 m. Leg. B. - Nuraghe Tradori. Leg. W. - Oristano, on acid rock. Leg. W.

S - Grotte di Nettuno (Capo Caccia) on limestone. Leg. W.

Lecania turicensis is the commonest saxicolous species of the genus on the island as it is in most other parts of Europe. It seems to be absent only in the northernmost part of the continent.

69 Lecanora

1 *L. achariana* A.L. Sm.

Syn.: *Lecanora cartilaginea* (Westr.) Ach.

N - P.ta Paulinu. North exposed acid rocks. Leg. NP (GZU,TSB).

S - M. Limbara, on moss over granite. Leg. E (TSB).

In Fennoscandia the lichen is most frequent on coastal rocks (also at the edge of inland lakes according to P.W. James, in litt.). The distribution in western Europe is poorly known; the relatively few collections come from mountain regions. The material from Sardinia corresponds well with specimens from northern Europe.

2 *L. agardhiana* Ach. subsp. *agardhiana*

N - M. Albo, on limestone. Leg. NP (TSB). - Between Cala Gonone and Dorgali. Leg. W.

3 *L. agardhiana* subsp. *catalaunica* Clauz. et Roux

N - M. Arcueri. Leg. E (GZU).

The subspecies, described by CLAUZADE & ROUX 1973: 18, seems to be clearly distinct. It could be a distinct species, but needs to be studied as more material becomes available.

4 *L. bandlensis* B. de Lesd.

Syn.: *Lecanora albescens* (Hoffm.) Branth. et Rostr. v.b. (B. de Lesd.) Clauzade et Roux.

C - Baia Chia. Leg. NP (GZU,TSB), det. C. Roux.- Buggerru, on limestone near the coast. Leg. M, E (GZU,TSB).

N - M. Arcueri, on limestone, with *Lecanora dispersa*. Leg. E (HbWB,GZU,TSB). - M. Albo. Leg. NP (TSB).

S - Tavolara. Leg. Brizzi (TSB).

This species, which seems to be not uncommon on the island, is not well understood. Most specimens are damaged by invertebrates.

5 *L. bicincta* Ram.

N - Bruncu Spina. Leg. NP (GZU,TSB). - Arcu Correboi. Leg. E (GZU,TSB), M. *Lecanora bicincta* var. *bicincta* is related to *Lecanora rupicola*, but can be easily distinguished on the basis of morphological characters. Sometimes the two taxa are growing side by side without any intermediates.

6 *L. bicincta* var. *sorediata* (Flot.) Leuckert et Poelt comb. nov.

Basion.: *Zeora glaucoma* var. *sordida* Flot., f. *sorediata* Flotow, Jahresber. Schles. Gesellsch. f. Vaterland. Kultur: 123. 1849.

N - Arcu Correboi. Leg. E (GZU).

The reason for the new combination will be included in a forthcoming paper by LEUCKERT & POELT. This lichen must be widely distributed in the mountains of central Europe, but has been seldom collected.

7 L. bolcana (Pollini) Poelt

C - P.ta Serpeddi'. Leg. NP (GZU,TSB). - Below P.ta Serpeddi'. Leg. NP (TSB). - Nora. Leg. NP (GZU). - M. Sette Fratelli, associated with *Pertusaria chiodectoneoides*. Leg. WP (W,SZU). - M. Maxias. Leg. Tretiach (TSB).

N - Su Lampu. Leg. W. - Rio Madau. Leg. W. - Arcu Correboi. Leg. B. - Villanova Strisaili. Leg. B. - Rio Pardu. Leg. WP, E (GZU). - P.ta Palai. Leg. Pertot (TSB).

O - M. Ferru. Leg. B.

S - Altopiano di Campeda. Leg. B. - Aggius (2 Km NNW of -) Leg. W. - M. Limbara, on granite. Leg. E (GZU,TSB).

This species is probably fairly common on the island; it is not restricted to human settlements like the allied *Lecanora muralis* and grows only on siliceous rocks (never on limestone).

8 L. campestris (Schaer.) Hue

C - Road Arbus-Buggerru. Leg. E (TSB). - Fluminimaggiore, 80-120 m, on schist. Leg. B. - "Ad rupes saxaque Montevecchio, Ruinas (Marcucci), Orri (Canepa)". (MOD. BAGLIETTO 1879:74, as *Lecanora subfusca campestris*).

N - Su Lampu, Leg. W. - Dorgali, 500 m, on granite. Leg. B. - Lanusei. Leg. E (GZU,TSB). - Esterzili. Leg. E (GZU). - Seui. Leg. M.

S - Tavolara. Leg. Brizzi (TSB). - Mara, 250-300 m. Leg. B.

9 L. carpinea (L.) Vain.

N - S'Arcu de Tascussi. Leg. NP (GZU,TSB). - Rio Aratu, on *Pyrus*. Leg. NP (TSB). - P.ta Palai, on *Acer*. Leg. NP (GZU,TSB). - M. Arcueri. Leg. E (GZU), M. - M. Ortobene, on *Populus* along the road. Leg. NP (GZU,TSB). - Between Desulo and Fonni, on *Quercus pubescens*, with *L. chlarotera*. Leg. W. - M. Arbo. Leg. M. - Arcu Correboi. Leg. E (SZU). - M. Albo. Leg. Pertot (TSB).

S - P.so La Variante. Leg. M.

In Sardinia this species seems to be confined to sites at higher elevations. Most specimens were small and found intermixed with other lichens.

10 L. cenisia Ach. var. **cenisia**

N - Bruncu Spina. Leg. NP (GZU,TSB). - Rio Aratu. Leg. NP (GZU). -

P.ta Palai. Leg. NP (GZU,TSB). - Arcu Correboi. Leg. E (GZU).

S - M. Limbara. Leg. M. - P.so La Variante. Leg. M.

The taxonomy of this species is still rather problematical. The colour of the disc varies from brownish to black. Specimens with a jet black disc are placed here under var. *melacarpa*, whose status, however, is doubtful.

11 *L. cenisia* var. *melacarpa* Nyl.

C - Between Arbus and Buggerru, on hard silicates. Leg. E (TSB). - M. Arcuentu. Leg. E (TSB).

O - Busachi, on trachyte (MAMELI 1920:166 as *Lecanora atrynea*).

See note on var. *cenisia*.

12 *L. chlarotera* Nyl. subsp. *chlarotera*

C - Road Arbus-Buggerru. Leg.M. - M. Sette Fratelli, with *Tephromela atra corticola*. Leg. WP.

N - M. Ortobene, on *Populus*. Leg. NP (TSB). - *ibid.* Leg. Pertot (TSB). - P.ta Palai, on *Acer*. Leg. NP (TSB). - Cala Gonone, 200-30 m, on *Quercus ilex*. Leg. B. - Villanova Strisaili, on *Alnus morisii*. Leg. B. - M. Arcueri, on *Quercus*. Leg. E (GZU,TSB), M. - M. Arbo. Leg. E (SZU,TSB), M. - Between Desulo and Fonni, on *Quercus pubescens*. Leg. W. - Rio Pardu. Leg. E (GZU). - Arcu Correboi. Leg. E (GZU,SZU). - Badde Orca. Leg. Pertot (TSB).

S - P.so La Variante, on *Pyrus*. Leg. E (SZU,TSB), M. - Nuraghe Loelle. Leg. Pertot (TSB). - Tavolara. Leg. Brizzi (TSB).

Like *Lecanora carpinea*, *Lecanora chlarotera* seems to be most frequent at higher elevations in Sardinia. It has been observed, but not collected, in several other localities, and is frequent on isolated trees.

13 *L. chlarotera* subsp. *meridionalis* (H. Magn.) Clauz. et Roux

C - Tupa Granella. Leg. Tretiach (TSB).

N - M. Albo, on twigs of *Quercus ilex*. Leg. Pertot (TSB).

S - Iago di Baratz. Leg. Pertot (TSB).

This subspecies differs from typical *Lecanora chlarotera* by the smaller spores, the entire, smooth, thalline margin and the darker disc.

14 *L. complanata* Koerb. s. lat. cf.

S - M. Limbara, clearly parasitic on *Rhizocarpon geographicum* s. lat. Leg. E (GZU), det. C. Roux.

This lichen, known from the Alps, is probably not even related to "*Lecanora*" *complanata* and needs further study.

15 **L. contractula** Nyl. cf.

C - Capo Pecora. Leg. M, E (GZU).

S - P.ta Falcone Leg. NP (GZU, TSB), with Caloplaca aractina. - M. Russu. Leg. E (GZU, TSB).

This lichen has a small whitish thallus and grows on coastal rocks, often associated with Caloplaca aractina. The thallus reacts C+ pale red, but the reaction is very variable in intensity. The lichen is somewhat different from northern material of *Lecanora contractula* (see POELT 1983); the whole group is under revision.

16 **L. crenulata** (Dicks.) Hook.

N - M. Albo, on limestone. Leg. NP (TSB).

17 **L. demissa** (Flot.) Zahlbr.

N - Giara di Gesturi, on overhangig rocks. Leg. NP (GZU).

This species certainly does not belong to *Lecanora* s. str. but we have never seen apothecia, even on very large collections. It grows at low elevations in central Europe but it seems to be restricted to higher sites in the Mediterranean area.

18 **L. dispersa** (Pers.) Sommerf.

C - Below P.ta Serpeddi'. Leg. NP (GZU, TSB).

N - P.ta Palai, with *Porina chlorotica*. Leg. NP (GZU). - M. Albo, on limestone. Leg. NP (TSB). - Supramonte di Oliena. Leg. W. - Seui, rocks of a wall. Leg. E (GZU, TSB).

S - Tavolara, on limestone. Leg. Brizzi (TSB).

The difference between this species and *Lecanora xanthostoma* remains an unsolved problem. The *Lecanora dispersa* complex needs to be studied in more detail.

19 **L. dispersella** s. lat. (vix Steiner)

C - Barumini. Leg. E (GZU), det. C. Roux.

20 **L. frustulosa** (Dicks.) Ach. s.l.

C - M. Santo di Pula. Leg. Canepa (BAGLIETTO 1879:76).

BAGLIETTO op.cit. refers to *Lecanora frustulosa* var. *ocellulata* (Massal.) Arn.; we have not seen the specimen.

21 **L. gangaleoides** Nyl.

C - M. Arcuentu, on granitic rock. Leg. E (GZU). - Isola dei Cavoli. Leg. NP (GZU, TSB). - Below P.ta Serpeddi'. Leg. NP (TSB). - Isola di S. Antioco. Leg. Brizzi (TSB). - Is Coronas. Leg. Tretiach (TSB). - Rio Alino. Leg. Tretiach (TSB).

N - P.ta Palai, on porphyric rock. Leg. B. - Torre Argentina. Leg. NP (GZU,TSB).

S - Altopiano di Campeda, on basaltic rock. Leg. B. - Capo Orso, on granite, with *Pertusaria mammosa*. Leg. E (GZU,TSB). - Badesi Mare, epiphytic on *Juniperus*. Leg. E (TSB). - P.ta Falcone. Leg. Pertot (TSB). - P.so La Variante. Leg. M.

This subatlantic species (see WIRTH 1972:71) seems to be more or less restricted to the coast in northern Europe whereas it is also found on low mountains with a suboceanic climate in central Europe, and even more so in the Mediterranean islands.

22 L. glabrata (Ach.) Malme

N - P.ta Palai, on Acer. Leg. NP (GZU).

A somewhat puzzling form formally corresponding with the description of *Lecanora glabrata*. The taxonomy of this lichen is uncertain to us.

23 L. hageni (Ach.) Ach.

C - Portixeddu, on *Juniperus macrocarpa*. Leg. M. - Barumini, on *Prunus*. Leg. E (GZU, TSB). - "Ad Cupressorum et Fici corticem in praedio Mossa, Giorgino, super trabes pontium Scaffa prope Cagliari (Canepa)" (BAGLIETTO 1879:75).

N - Lanusei, on *Juglans*. Leg. E (TSB). - Seui, on *Ulmus*. Leg. E (GZU,TSB), M. - M. Arcueri, on wood. Leg. M.

S - SS. Trinita' di Saccargia, on *Ulmus*. Leg. E (TSB). - Tempio Pausania, on *Ulmus*. Leg. E (TSB).

The circumscription of this taxon needs further study.

24 L. hypoptoides Nyl.

N - Arcu Correboi, on wood. Identification not completely certain. Leg. E (GZU).

25 L. intricata (Ach.) Ach.

C - M. Arcuentu, on siliceous rock, with *Lecanora sulphurata*. Leg. E (GZU)

O - M. Ferru (3 Km ESE Cuglieri). Leg. B.

S - M. Limbara, with *Lecidea lactea*. Leg. E (GZU).

26 L. intumescens (Rebent.) Rabenh.

N - Seui, ad corticem *Castanearum*. Leg. Marcucci (BAGLIETTO 1879:74). - M. Arbo. Leg. E (SZU).

We have not checked the identification of Baglietto. *Lecanora intumescens* is known from several stations along the Italian peninsula, from the Alps to Sicily (TSB), mostly occurring in humid beech-woods of

the montane vegetation belt.

27 L. laatokkaensis Raes.

N - P.ta Paulinu, on rock in mountain ridge. Leg. NP (GZU,TSB). -

Arcu Correboi, on silicates. Leg. E (TSB).

Lecanora laatokkaensis is a rare species throughout its range, possibly due to its restriction to special types of siliceous rocks.

28 L. lisbonensis Samp.

Syn.: *Coscinacladium occidentale* Kunze

C - Baia Chia, on limestone. Leg. NP (GZU, TSB).

This western species, known from Portugal, Spain, western France (see CLAUZADE & ROUX 1985:428) and Majorca, grows mostly on very soft calcareous sandstone. Since apothecia have been never found, its taxonomy remains unclear; it nevertheless has little to do with the genus *Lecanora* in its narrowest sense.

29 L. lividocinerea Bagl.

C - " Sull' Erica arborea alla torre di Cala di Ostia, presso Pula, nella Sardegna Meridionale". 1867. Leg. Canepa. Erb. Crittog. Ital. Ser. II, 167. Typus (MOD). (BAGLIETTO 1879:75, with original diagnosis). - Costa Verde (near the mouth of Rio Piscinas), on bark. Leg. B.

This species of the subfusca - group, characterized by the C+ red reaction of the thallus, superficially resembles some corticolous forms of *L. cenisia*. According to CLAUZADE & ROUX 1985: 404, outside Sardinia it is known from Corsica, the Balearic Islands, Liguria and the Ile de Hyeres. For its occurrence in southern France see ABASSI MAAF & ROUX 1984:198.

30 L. muralis (Schreb.) Rabenh. var. **muralis**

C - M. Arcuentu. Leg. M, E (GZU,TSB). - Below P.ta Serpeddi'. Leg. NP (GZU,TSB). - P.ta Serpeddi'. Leg. NP (GZU). - Rio Giutturu Mannu. Leg. NP (GZU). - S. Pantaleo. Leg. Tretiach (TSB).

N - Arcu Correboi. Leg. M. - M. Arcueri. Leg. E (TSB).

This lichen is mostly confined to the margins of settlements, or on artificial substrates at roadsides. In Sardinia it is less frequent than the closely related *Lecanora bolcana*.

31 L. muralis var. **dubyi** (Muell. Arg.) Poelt

C - Below P.ta Serpeddi'. Leg. NP (GZU,TSB).

N - P.ta Palai. Leg. NP (GZU,TSB). - ibid. Leg. Pertot (TSB). - Nuoro, on epilithic mosses over granite. Leg. B.

S - Nuraghe S. Antine, on acid rock. Leg. E (TSB).

Under this name we combine a variable group of forms, all with very thick, almost foliose thalli and markedly convex lobes. Specimens of the var. *duby* sometimes grow side by side with specimens of var. *muralis*: in this case the differences between the two varieties are evident, without intermediates. The group needs further study.

32 L. "muraliformis" ad int.

C - Rio Giutturu Mannu. Leg. NP (GZU).

N - Rio Aratu. Leg. NP (GZU).

33 L. ochroidea (Ach.) Nyl.

C - Giara di Gesturi. Leg. NP (GZU).

N - M. Arbo. Leg. M.

We follow CLAUZADE & ROUX 1985:406 in naming *Lecanora ochroidea* a lichen which is similar to *Lecanora subcarnea* but has a thallus which is K+ yellow, then red, and C+ pale yellow. The species is also somewhat different in habit from *Lecanora subcarnea*. Another similar taxon is *Lecanora trevisanii* Massal. (Syn.: *Lecanora massalongiana* Trevis.), whose thallus, however, reacts K+ yellow and the disk K+ red, at least according to a specimen named *Lecanora massalongiana* Trevis. which was sent to Arnold (M). The complex should be treated on the basis of chemical characters. Compare also the discussion in Th. FRIES 1871: 242.

34 L. pallida (Schreb.) Rabenh.

C - M. Sette Fratelli, on Castanea. Leg. Canepa (MOD. BAGLIETTO, 1879:75).

N - "Super Genistam Aspalathoidem et Prunos circum Seui (Marcucci)" (BAGLIETTO 1879:75).

We were unable to check the identification of the specimen from Seui.

35 L. persimilis Th. Fr.

C - Portixeddu, on bark. Leg. E (GZU,TSB; SZU, as *Lecanora umbrina*).

N - M. Ortobene, on Populus. Leg. NP (GZU).

S - Badesi Mare, on Juniperus. Leg. E (GZU,TSB).

Under this name we include a *Lecanora* of the *hageni*-group with small, appressed, often confluent apothecia and a whitish or more or less brownish margin. The lichen has probably been named *Lecanora umbrina* in many publications.

36 L. poeltiana Clauzade et Roux

C - Buggerru, on limestone. Leg. E (HbWB,GZU,TSB).

This quite recently described species (CLAUZADE ET ROUX 1984) seems to be confined to very hard calcareous rocks near the coast. It is known from Southern France, Sardinia, Majorca (not yet published) and Catalonia.

37 L. polytropa (Ehrh.) Rabenh.

C - P.ta Serpeddi'. Leg. NP (GZU,TSB). - Below P.ta Serpeddi'. Leg. NP (TSB).

N - Bruncu Spina. Leg. NP (TSB). - Arcu Correboi. Leg. E (GZU). - M. Arcueri. Leg. M. - M. Mannu. Leg. NP (GZU),det. H.Vänskä.

S - M. Limbara. Leg. M.

The *Lecanora polytropa* complex of species is currently undergoing revision by H. Vänskä.

38 L. prominens Clauz. et Vezda

N - M. Albo. Leg.NP (GZU). - M. Arcueri,with *Caloplaca dolomiticola*. Leg. E (GZU).

S - Capo Caccia, on limestone. Leg. Pertot (TSB).

Lecanora prominens is normally an easily recognized species described from southern France (CLAUZADE ET VEZDA 1966). The species is now known from several localities in the Mediterranean region (for its distribution in southeastern Spain see CASARES & LLIMONA 1983:224). It seems to be confined to very hard calcareous rocks.

39 L. pruinosa Chaub.

N - M. Albo. Leg. NP (GZU, TSB)). - Between Cala Gonone and Dorgali. Leg. W. - Cala Gonone, on limestone. Leg. B. - Supramonte di Oliena. Leg. W. - Grotta Su Marmuri. Leg. B.

S - Capo Caccia, on limestone. Leg. NP (GZU,TSB).

Most specimens were growing in sheltered positions, see also note on *Lecanora reuteri*.

40 L. puniceofusca Bagl.

C - "Ad rupes granitoideas Buellia badio-atra et Lecidea fusco-atra consociata circum Capoterra (Canepa): adest etiam in Herbario Morisiano". (MOD, holotypus, with a more detailed specification of the locality : "Abbondante sulle roccie a S. Barbara sopra Capoterra". BAGLIETTO 1879:73-74).- S. Lucia. Leg. NP (GZU,TSB). - Rio Giutturu Mannu. Leg. NP (GZU,TSB).

N - Torre Argentina. Leg. NP (GZU).

S - Capo d' Orso, on granite. Leg. E (GZU).

This largely overlooked lichen seems to be a distinctive species of the *Lecanora subfusca*-group. Judging by the type material and by our

collections, the species grows almost exclusively on very coarse-textured silicates which are particularly frequent in the north of the island and seems to be widespread in suitable localities.

41 *L. reuteri* Schaer.

O - Paulilatino (above -), on limestone. (MAMELI 1920:164).

N - Orani; ex herb. Garovaglio (MAMELI 1920:164).

We were unable to check the identifications of MAMELI. The occurrence of *Lecanora reuteri* in Sardinia is not an impossibility; however, since MAMELI op.cit. does not cite *Lecanora pruinosus* in her publication, we suspect that her samples could belong to the latter, more common, species.

42 *L. rhizinata* Poelt, Barreno et Rico

N - Arcu Correboi. Leg. E (GZU).

Our material was scant and very fragmentary, so that the identification is not completely certain. The areoles are peltate and clearly stipitate. The species was described from the Sierra de Ayllon (central Spain, see POELT, BARRENO & RICO 1983).

43 *L. riparia* auct.

C - Below P.ta Serpeddi', with *Lecanora muralis*. Leg. NP (GZU).

This lichen is more or less identical to *Lecanora muralis*; there are slight differences, such as the brownish green colour in the fresh material. Our specimen was growing with typical *Lecanora muralis*. The taxonomy of this lichen, which is well known from the eastern Mediterranean region, needs clarification.

44 *L. ripartii* Lamy in Nyl.

C - M. Arcuentu. Leg. E (SZU), M.

N - Torre Argentina. Leg. NP (GZU). - Bosa, on liparite. Leg. B. - M. Mannu. Leg. NP (GZU).

This is *Lecanora ripartii* as interpreted by POELT 1952; the species may have a more or less subatlantic-submediterranean distribution.

45 *L. rubicunda* Bagl.

C - Teulada, on *Opuntia*. Leg. Bellisai (MOD, holotypus. BAGLIETTO 1879:74-75: "unicum tantum vidi specimen ad *Opuntias* circum Teulada a Doct. Bellisai collectum et benevole a cl. Prof. P. Gennari communicatum").

Since this species is little known, a short description of the type material is given (the anatomical description is based on section of a single apothecium).

The specimen is on a piece of *Opuntia* which is 2.5 cm long and 1.5 cm broad. The material is damaged (in herb.). Thallus epiphloeodal, whitish, mostly granulose. Apothecia numerous, in groups, rather thick, constricted at the base, not adpressed, ca. 1.5 mm diam, the margins only in a very young state thick, otherwise thin to evanescent, mostly smooth; sometimes a distinct margo proprius is developed. Disc flat to very convex, pale to deep reddish brown, slightly pruinose. Thallus and disc K+ yellow, then red.

Cortex of the apothecium $\pm 30 \mu\text{m}$ thick, strongly gelatinized, interspersed with small grains. Medulla with many algae, with large concretions of big crystals, insoluble in KOH. Hymenium $\pm 80 \mu\text{m}$ high, gelatinized. Paraphyses thin, rarely branched-anastomosing. Upper part of the hymenium not coloured. Epispamma with large grains, which dissolve in KOH to give crystals of norstictic acid. Spores 8 per ascus, thick-walled, sometimes somewhat bifusiform, ca. $11-12 \times 5-6 \mu\text{m}$.

The species is a member of the *Lecanora subfusca* complex. Since there are species of this group with norstictic acid in other parts of the temperate zone, growing both on bark and on rock, *Lecanora rubicunda* should be compared with these.

46 *L. rupicola* (L.) Zahlbr.

C - P.ta Serpeddi', on acid rocks. Leg. NP. (GZU,TSB). - Giara di Gesturi. Leg. NP (TSB). - Below P.ta Serpeddi'. Leg. NP (TSB). - M. Sette Fratelli, 600 m, on granite. Leg. WP.- Capoterra. (MOD. BAGLIETTO 1879:77, as *Lecanora sordida*). - M. Arcuentu. Leg. M. - M. Maxias. Leg. Tretiach (TSB).

N - Su Lampu. Leg. W. - Arcu Correboi. Leg. WP, B, E (HbWB). - Altopiano di Campeda, on basaltic lava. Leg. B. - M. Arcueri. Leg. M. - Tonara (COLOSI 1917:466 as *Lecanora sordida*).

O - M. Ferru. Leg. W, B.

S - Nuraghe S. Antine, on basaltic rock. Leg. E (HbWB,TSB). - M. della Neula, 350-415 m, on granite. Leg. B. - M. Limbara, on granite. Leg. E (HbWB,SZU,TSB).

Lecanora rupicola seems to be rather common on the island; it often grows with the closely allied *Lecanora sulphurata* and *Lecanora subplanata*. The whole complex forms the basis of a detailed study in a forthcoming paper by LEUCKERT & POELT.

47 *L. salina* H. Magn.

C - Capo Pecora, on granite, with *Caloplaca aractina*. Leg. E (GZU, TSB).

S - P.ta Falcone. Leg. NP (GZU, TSB) - M. Russu, with *Caloplaca aractina*. Leg. E (TSB).

The taxonomy of this species needs further study. Our specimens agree

quite well with descriptions and some extant collections. They do not give any reaction with C; some collections, reacting C+ red, are here placed under *Lecanora contractula*.

48 *L. schistina* (Nyl.) Arn.

Syn.: *L. praepostera* auct., *Lecanora sardoa* Bagl. (?).

C - P.to S. Stefano. Leg. NP (GZU). - Below P.ta Serpeddi'. Leg. NP (GZU). - Ciri Foddi. Leg. NP (GZU,TSB). - S. Lucia, on hard silicates. Leg. NP (TSB). - M. Arcuentu, on granite. Leg. E (GZU). - Isola dei Cavoli. Leg. NP (GZU). - Rio Is Fonsuas. Leg. Tretiach (TSB). - Santadi. Leg. Tretiach (TSB).

N - Rio Pardu. Leg. E (GZU).

S - P.ta Falcone. Leg. NP (TSB), W. - Capo Orso, on granite. Leg. M, E (HbWB, GZU). - P.so La Variante. Leg. M. - S. Teresa di Gallura. Leg. M - M. Russu. Leg. E (HbWB, SZU, TSB).

Lecanora schistina seems to be a rather common species in Sardinia. In the nomenclature we follow CLAUZADE & ROUX 1985, who discuss the identity and status of *Lecanora schistina* and *Lecanora praepostera*. Furthermore, LLIMONA (handwritten note in herb. MOD) stated the identity of *Lecanora schistina* with *Lecanora sardoa* (BAGLIETTO 1879: 73), which was described mainly on the basis of the K+ red reaction. However, according to I. Brodo (in litt.) the two species seem to be distinct. The problem is presently under revision by I. Brodo. *Lecanora schistina* seems to be common everywhere on the island. To our knowledge, this species is confined to the Mediterranean and submediterranean region, perhaps with a Mediterranean-atlantic tendency.

49 *L. sienae* B. de Lesd.

Syn.: *L. laevis* Poelt

C - Barumini. Leg. E (GZU,TSB) - Tupa Granella. Leg. Tretiach (TSB). - Portixeddu. Leg. E (SZU,TSB) M.

N - M. Ortobene, on *Populus*. Leg. NP (GZU,TSB).

O - Stagno di Cabras, 3-5 m, on *Opuntia*. Leg. B.

S - Mara, 80 m, on *Quercus*. Leg. B. - Altopiano di Campeda. Leg. B. - Tempio Pausania, on *Ulmus*. Leg. E (TSB). - Tavolara. Leg. Brizzi (TSB). - Lago Baratz. Leg. Pertot (TSB).

Probably not uncommon on the island; we observed it in several other places. Perhaps it is more frequent than *Lecanora carpinea* and *Lecanora chlarotera* at lower altitudes.

50 *L. silvae-nigrae* Wirth

N - P.ta Paulinu, on schist. Leg. NP (GZU), det. H. Vänškä.

51 L. subcanea (Liljeblad) Ach.

C - Giara di Gesturi. Leg. NP (GZU,TSB). - M. Maxias. Leg. Tretiach (TSB).

N - Arcu Correboi. Leg. E (GZU,TSB). - P.ta Palai. Leg. NP (GZU, TSB). - M. Arbo. Leg. M. - Rio Aratu. Leg. NP (GZU).

S - P.so La Variante. Leg. E (TSB), M.

This species grows on steep to overhanging siliceous rocks.

52 L. subplanata Nyl.

C - Giara di Gesturi. Leg. W. - Below P.ta Serpeddi'. Leg. NP (TSB).

N - Arcu Correboi. Leg. E (GZU, TSB).

S - Nuraghe S. Antine, on acid rock. Leg. E (TSB). - P.so La Variante. Leg. M.

This lichen, which is often associated with the closely allied but chemically different *Lecanora rupicola* and *Lecanora sulphurata*, is certainly more common on the island than it would appear from our few collections.

53 L. sulphurata (Ach.) Nyl.

Syn.: *Lecanora sordida* var. *flavescens* Baglietto in ARNOLD 1872:289, *Lecanora flavescens* Baglietto in BAGLIETTO 1879:77. Exs.: ARNOLD lich. exs. 1702 "auf dem Gipfel der Flumini-bina bei Carolitana in Sardinien, leg. Canepa, mis. Baglietto" (MOD, vidimus). - Erb. Critt. Ital. Ser. II Nr. 315 "Sulle vette del Flumini-bina sopra Orri nella Sardegna meridionale" (MOD, vidimus).

C - Giara di Gesturi. Leg. NP (GZU,TSB), W. - M. Sette Fratelli, 600 m, on granite and basalt. Leg. WP. - M. Arcuentu, on acid rock. Leg. E (TSB), M. - P.ta Serpeddi'. Leg. NP (GZU,TSB). - Below P.ta Serpeddi' Leg. NP (TSB). - "Ad rupes granitoideas in cacuminibus Flumini-Bina abunde, in Monte Santo Pula, Pula ad marem, circum Capoterra (Canepa)" (Several specimens in MOD. BAGLIETTO 1879:77-78, as *Lecanora flavescens*). - M. Maxias. Leg. Tretiach (TSB).

N - Bruncu Spina. Leg. NP (GZU,TSB). - Arcu Correboi, on schist. Leg. B. - ibid. Leg. E (GZU,TSB), M. - M. Arcueri. Leg. M. - Seui (MOD. BAGLIETTO 1879:78).

S - Altopiano di Campeda, on basaltic rock. Leg. B. - Nuraghe S. Antine, on acid rock. Leg. E (HbWB,TSB). - P.so La Variante. Leg. E (SZU).

The taxonomy and nomenclature of this and related species are presently under revision by LEUCKERT & POELT.

54 L. sulphurea (Hoffm.) Ach.

C - M. Sette Fratelli, with *Pertusaria digrediens*. Leg. WP - "In finitimis Cagliari, Pula et inter Sarcc (sic !) inque monte Santo Pula (Gennari, Canepa)". (BAGLIETTO 1879:78). - M. Maxias. Leg. Tretiach (TSB).

N - M. Arcueri. Leg. M. - Tonara (COLOSI 1917:467).

S - M. Limbara, on granite. Leg. E (GZU, TSB), M. - S. Teresa di Gallura, on granite. Leg. E (GZU, TSB), M. - M. Russu. Leg. E (TSB).

55 L. sulphurea "calcicola"

N - M. Albo, on limestone rocks. Leg. NP (GZU, TSB).

Typical *Lecanora sulphurea* only occurs on acidic rocks. In different parts of southern Europe on rare occasions we have seen specimens of *Lecanora sulphurea* growing on limestone: in such cases they always had a very thick, cretaceous thallus. These may be equivalent to *Tephromela atra* var. *calcareo* with which it was associated in the collection from M. Albo.

56 L. swartzii (Ach.) Ach.

Syn.: *Lecanora subradiosa* auct., non Nyl.

N - Arcu Correboi. Leg. E (GZU), M.

The nomenclature of this characteristic lichen is rather confused. For a long time it was named *Lecanora subradiosa* but the type of *Lecanora subradiosa* has nothing to do with this taxon, which is correctly named *Lecanora swartzii*. This name, however, has until now been incorrectly considered to be a synonym of *Lecanora rupicola*. The collection from Arcu Correboi is possibly a new chemotype of *Lecanora swartzii* (LEUCKERT & POELT, in prep.).

57 L. symicta (Ach.) Ach.

C - "Ad trabes pontium Scaffa in finitimis Cagliari (Canepa) (MOD. BAGLIETTO 1879:76).

N - P.ta Palai. Leg. NP (GZU).

58 L. umbrosa Degel.

C - Giara di Gesturi, with *Acarospora microcarpa*. Leg. NP (GZU).

59 L. varia (Hoffm.) Ach.

N - Arcu Correboi, on wood. Leg. E (GZU). - "Ad veteres asseres circum Arizzo, commixta Acolio tigillare in herb. Moris" (BAGLIETTO 1879:76).

S - M. Limbara on *Juniperus*, wood. Leg. E (TSB). - ibid. on *Pinus*. Leg. Pertot (TSB).

This is the well known and typical *Lecanora varia*. In Sardinia it seems to occur only at high altitudes.

60 L. xanthostoma Weddell ex Roux

Typus: France, Poitiers, Leg. Weddell (P). According to ROUX 1976:25.

C - Is Pauceri. Leg. NP (TSB). - Giara di Gesturi. Leg. NP (GZU). - Ciri Foddi. Leg. NP (GZU). - Capo Pecora, with *Lecanora contractula*. Leg. E (GZU,TSB).

N - M. Albo, with *Caloplaca schaererii*. Leg. NP (GZU). - Arcu Correboi. Leg. M. - Esterzili. Leg. E (GZU). - Desulo. Leg. NP (GZU). - Between Cala Gonone and Dorgali, a small thallus among areolae of *Aspicilia calcarea*. Leg. W.

Lecanora xanthostoma is similar and allied to *Lecanora dispersa*, but is C+ orange and characterized by the often aggregate apothecia and the more or less parasitic behaviour. We have found specimens of *Lecanora* with the same characters in different parts of Europe and also in Sardinia. Possibly two different taxa are involved, one with the characters given above, and another which is not parasitic and has dispersed apothecia with whitish margins (like *Lecanora dispersa*, but the margins reacting C+ orange and containing a xanthone). The taxonomy of this group can only be settled by a careful study of the whole complex of related C+ and C- representatives. The relationship to *Lecanora fugiens* Nyl. should also be clarified.

70 L e c i d e a

1 L. assimilis (Koerb.) Th.Fr.

O - M. Ferru, parasitic on a indeterminable crustaceous lichen. Leg. W.

2 L. confluens (Web.) Ach.

N - Bruncu Spina, on acid rock. Leg. NP (GZU).

Lecidea confluens belongs to the widely distributed arctic-alpine (subalpine) element, which in Sardinia is confined to the highest ridges of the Gennargentu Massive.

3 L. deustata Zahlbr.

N - Bruncu Spina. Leg. NP (GZU,TSB). - P.ta Paulinu. Leg. NP (GZU,TSB).

S - P.so La Variante, with *Rhizocarpon dinohetetes*. Leg. E (GZU).

Lecidea deustata grows on very hard, non-calcareous silicates. The species has an irregular distribution pattern; it is well known from northern and northwestern Europe, mostly near the coast. In southern

Europe it may be restricted to the mountains.

4 L. fuliginosa Tayl. ap. Mack.

Syn.: *Psora fuliginosa* (Tayl.) Stein.

S - P.so La Variante, with *Lecanora gangaleoides*. Leg. M.

The material is very scarce, and the identification is not certain.

5 L. fuscoatra (L.) Ach. s. lat. (excl. v. *grisella*)

C - "Ad rupes graniticas in montibus Capoterra, ad muros campestres iuxta Orri (Canepa)" (BAGLIETTO 1879:97). - Below P.ta Serpeddi'. Leg. NP (TSB). - P.ta Serpeddi'. Leg. NP (GZU,TSB). - Is Pauceri. Leg. NP (TSB). - M. Sette Fratelli, 2.5 Km from M. Arbu, 600 m. Leg. WP. (GZU). - Giara di Gesturi. Leg. NP (TSB). - Rio Alino. Leg. Tretiach (TSB).

N - Bruncu Spina. Leg. NP (TSB). - Rio Madau. Leg. W.- Rio Pardu. Leg. E (GZU). - Seui. Leg. Canepa (MOD. BAGLIETTO 1879:97).

O - M. Ferru. Leg. W.

S - P.so la Variante. Leg. E (TSB). - M. Limbara, on granite. Leg. E (GZU,TSB), M. - ibid. Leg. Pertot (TSB). - Nuraghe S. Antine, on acid rock. Leg. E (TSB). - Aggius. Leg. WP.

Lecidea fuscoatra is a rather common lichen on limestone-poor rocks, ranging from south Scandinavia (HERTEL 1975: 66; 1977: 246) to the Mediterranean region and Madeira. The var. *grisella* is more southern, and more nitrophytic than var. *fuscoatra* (WIRTH 1980: 316). The species is extremely variable, and in Sardinia the variability is even higher than elsewhere. The species should include several not yet clear taxa.

6 L. fuscoatra var. *grisella* (Flk.) Nyl.

C - M. Arcuentu. Leg. M. - "In rupibus Sarocc inter et Pula" (BAGLIETTO 1879:98, as *Lecidea grisella*).

N - Rio Madau, together with v. *fuscoatra*. Leg. W

S - M. Limbara, on granite, with v. *fuscoatra*. Leg. E (TSB), M.

The taxonomic status of this variety is doubtful to us.

7 L. insidiosa Th. Fr. cf.

C - M. Arcuentu, parasitic on *Lecanora muralis*. Leg. M.

These specimens clearly resemble this taxon, but they do not match in all of the characters.

8 L. lactea Flk. ex Schaer.

Syn.: *L. pantherina* auct., non (Hoffm.) Ach.

C - P.ta Serpeddi'. Leg. NP (GZU,TSB).

S - M. Limbara, with "*Lecanora*" sp. Leg. E (GZU).

9 L. lapicida (Ach.) Ach.

C - P.ta Serpeddi'. Leg. NP (GZU,TSB).

N - Arcu Correboi. Leg. M.

O - M. Ferru. Leg. W.

S - M. Limbara. Leg. M.

Lecidea lapicida and the closely related *Lecidea lactea* belong more or less to the same phytogeographical element as *Lecidea confluens*.

10 L. lurida (With.) Ach.

Syn.: *Psora lurida* (Ach.) DC.

N - M. Albo, in fissures of calcareous rocks. Leg. NP (TSB). - Arcu Correboi. Leg. B.

O - Paulilatino, on limestone. (MAMELI 1920: 169).

A common species on calcareous soil; it extends to north Scandinavia. A very similar species, *Psora luridella* (Tuck.) Fink, occurs in North America. According to TIMDAL 1984:534 *Lecidea lurida*, which is commonly included in *Psora*, does not belong to the genus, and must be temporarily re-instated in *Lecidea* s.lat.

11 L. luteoatra Nyl.

N - Bruncu Spina. Leg. NP (GZU,TSB).

S - M. Limbara. Leg. E (GZU).

The distribution of this species, characteristic of very hard siliceous rocks rich in quartz is very imperfectly known; very often this lichen grows in places where there is a periodic seepage of water.

12 L. nigroleprosa (Vain.) Magn.

N - P.ta Paulinu, with *Lecidea deustata*. Leg. NP (GZU,TSB).

The species is characterized by the epilithic, crustose-areolate dark grey thallus with soredia on the oldest, somewhat convex, areoles. It has an arctic-alpine distribution and grows on acid silicates (often on granite) in exposed positions. For its distribution in central Europe see WIRTH 1972:186 and VEZDA 1978: 407-408).

13 L. obluridata Nyl.

C - Giara di Gesturi, with *Diploschistes bisporus*. Leg. NP (GZU).

N - M. Arcueri. Leg. M.

Identification after CLAUZADE & ROUX 1985.

14 L. promiscua Nyl.

N - Arcu Correboi. Leg. E (GZU).

This widely distributed species is closely related to *Lecidea*

promiscens Nyl. but has a distinct epilithic thallus. The material from M. Limbara corresponds well to the species as defined, for instance, by HERTEL 1967:74.

15 L. sarcogynoides Koerb.

N - Lanusei, on a wall. Leg. E (GZU).

16 L. sardoa Bagl.

Lecidea ("Lecidia") sardoa Baglietto in sched. ad Erbar. Crittogam. Ital. Ser. II no. 516 (1861); ARNOLD, Verhandl. Zool.-Bot. Gesellsch. Wien, 20:530 (1870); BAGLIETTO Nuovo Giorn. Botan. Italiano, 11:98 (1879) - Typus: Sardegna meridionale: sulle rupi tra Sarocc e Pula, III. 1867. Leg. Canepa. Erb. Critt. Ital. Ser. II no. 516 (MOD: holotypus et isotypi, M: isotypus - all types seen by HERTEL, in litt.).

Lecidea sardoa was described by BAGLIETTO in the comments to the exsiccata of the Erbario Crittogamico Italiano. ZAHLBRUCKNER (Cat. Lich. Univ. 3: 686, no. 6707) overlooked the valid description by Baglietto "in sched." and cited Arnold as first author (Bagl. apud Arnold 1870).

The type material of Lecidea sardoa was studied by HERTEL who claims (in litt.) that the species is nearly allied to Lecidea fuscoatra, but seems to be chemically distinct. The species is presently under revision.

It may be that in this list collections of Lecidea sardoa are placed under Lecidea fuscoatra.

17 L. swartzioidea Nyl.

S - M. Limbara. Leg. M.

This lichen is a member of the arctic-alpine Lecidea lapicida group.

18 L. sp.

C - Below P.ta Serpeddi'. Leg. NP (GZU).

N - Arcu Correboi. Leg. E (GZU).

The specimens of our collections were thought at first to be close to Lecidea (Porpidia) athroocarpa. According to H. HERTEL (in litt.), however, they do not belong to this species, since the medulla reacts J-, the apothecia have no sign of a pigmented hypothecium and the thallus contains norstictic acid instead of confluentin and 2'-O-methylperlatolic acid.

Our specimens have no well developed asci, so that a correct identification is not yet possible.

71 L e c i d e l l a

1 *L. achristotera* (Nyl.) Hertel et Leuck.

Syn.: *Lecidea achristotera* Nyl.

C - Portixeddu. Leg. M, E (GZU,TSB).- Santadi. Leg. Tretiach (TSB).

- Road Arbus-Buggerru. Leg. E (GZU).

N - M. Arcueri, on twigs. Leg. E (GZU).

S - P.so La Variante, on *Pyrus*. Leg. M. - Tavolara. Leg. Brizzi (TSB).

Lecidella achristotera is distinguished from *Lecidella elaeochroma* by the inspersion of small droplets in the hymenium. The amount of inspersion varies considerably, and the taxonomic reliability of this character is not yet clear. On the other hand, such inspersion is lacking in *Lecidella elaeochroma* s.l. throughout most of its range.

At P.ta Falcone we collected an unusual form which is described below as a new variety, in order to draw the attention to it.

2 *L. achristotera* var. *juniperina* Poelt et Nimis var. nov.

Typus: Sardinia, Prov. Sassari, P.ta (Capo) Falcone, on *Juniperus*. Leg. W (GZU).

Differt a var. *achristotera* inspersione hymenii guttis oleosis permagnis; guttule parvulae, speciei typicae desunt.

Sections of the hymenia of var. *juniperina* appear greyish at low magnification; the hymenium is interspersed with very large, often irregularly ellipsoid oil droplets ca. 5-10 μ m in length; sometimes the droplets aggregate into larger complexes. Spores 6.5-8 x 7-14 μ m. The specimens from Sardinia have a thin crustose thallus which is easily eaten by invertebrates. Undamaged specimens from central Latium (Castelporziano, SW of Rome), also on *Juniperus* on coastal sand dunes, have a very thick, crustose-verrucose thallus which is clearly different from that of typical *Lecidella achristotera*. The variety is described here mainly to draw attention to this peculiar form and seems to be restricted to coastal stations under the influence of sea spray. It is known also from Tuscany (Parco di Migliarino, TSB), central and south Latium (Castelporziano and Parco del Circeo, TSB). In the peninsular stations var. *juniperina* grows with *Tornabea scutellifera*, *Teloschistes villosus*, *Ramalina lacera*, *Caloplaca pollinii*, *Bacidia* cf. *fallax*. The name derives from latin "*juniperina*", "belonging to *Juniper*".

3 *L. anomaloides* (Massal.) Hertel et Kilius

Syn.: *Lecidea umbrosa* (Bagl. ex Massal.) Hertel; *Lecidea goniophila* auct.

N - Rio Aratu. Leg. NP (GZU).

This long misunderstood and differently named taxon seems to have been rarely collected. Its distribution is poorly known. According to HERTEL (in litt.) our collection corresponds well with the type material.

4 *L. carpathica* Koerb.

Syn.: *Lecidea latypea* auct. p.p.; *Lecidea latypiza* Nyl.

- C - Giara di Gesturi. Leg. NP (GZU,TSB), W. - Below P.ta Serpeddi'. Leg. NP (GZU,TSB). - Road Arbus-Buggerru, on phyllites. Leg. E (HbWB). - M. Arcuentu, with *Aspicilia radiosa*. Leg. E (GZU,TSB). - S. Pantaleo. Leg. Tretiach (TSB). - Giba. Leg. Tretiach (TSB).
N - Bruncu Spina. Leg. NP (GZU, TSB). - Seui. Leg. M. - Su Lampu. Leg. W. - Arcu Correboi. Leg. M. - Desulo. Leg. NP (TSB).
S - Torralba. Leg. M. - M. Limbara, on granite. Leg. E (GZU,TSB). - Aggius (2 Km NNW from -). Leg. W. - P.so La Variante, on granite. Leg. E (HbWB).

Lecidella carpathica is a rather nitrophilous species on siliceous rocks (and sometimes also weakly calcareous sandstone), with a very wide distribution including all continents except Australia (HERTEL 1971: 247-248). Some of the specimens from Sardinia differ considerably from typical *Lecidella carpathica*; they await a critical revision of the whole complex.

5 *L. elaeochroma* (Ach.) Haszl. s.l.

Syn.: *Lecidea olivacea* (Hoffm.) Massal.; *Lecidea parasema* (Ach.) Ach. p.p.

- C - M. Arcuentu. Leg. M. - Road Arbus-Buggerru. Leg. M. - Costa Verde. Leg. B. - Arcu Genna Bogai. Leg. B. - Portixeddu. Leg. E (SZU). - Rio Alino. Leg. Tretiach (TSB). - Tupa Granella. Leg. Tretiach (TSB).
N - Arcu Correboi. Leg. E (SZU), B. - Rio Aratu, on *Pyrus*. Leg. NP (TSB). - Seui, on *Acer*. Leg. E (TSB). - M. Albo, on *Quercus ilex*. Leg. NP (TSB). - M. Arcueri. Leg. M, E (GZU), a form, perhaps a good taxon, with orange brown hypotecium. - M. Arbo. Leg. E (SZU,TSB), M. - Badde Orca. Leg. Pertot (TSB).
O - M. Ferru. Leg. B.
S - Mara. Leg. B. - Capo Orso, on *Quercus ilex*. Leg. E (TSB). - Altopiano di Campeda. Leg. B. - SS. Trinita' di Saccargia, on *Prunus*. Leg. E (TSB). - P.so La Variante. Leg. E (SZU). - Capo Caccia. Leg. Pertot (TSB). - Tavolara. Leg. Brizzi (TSB).

The *Lecidella elaeochroma* complex is much in need of a critical revision. In Sardinia, for instance we are certain that it contains a number of different taxa, but at present we are unable to give a clear

circumscription of the species.

6 L. euphorea (Flk.) Hertel

N - M. Arcueri, with *Lecidella elaeochroma* growing side by side.
Leg. M. - Rio Aratu, on *Ilex*. Leg. NP (TSB).

7 L. flavosorediata (Vežda) Hertel et Leuck.

C - Giara di Gesturi, on *Quercus suber*. Leg. NP (TSB).
This taxon is considered by CLAUZADE & ROUX 1985: 485 as a variety of *Lecidella elaeochroma*. It was previously known from the mountains of central Europe.

8 L. laureri (Hepp) Koerb.

N - P.ta Palai. Leg. NP (GZU).
This taxon with very unclear distribution pattern needs to be studied furthermore.

9 L. scabra (Tayl.) Hertel et Leuck.

Syn.: *Lecidea protrusa* auct.

N - M. Mannu. Leg. NP (GZU,TSB). - Torre Argentina, with *Rinodina subglauescens*. Leg. NP (GZU).

The species is easily identified by its yellowish soralia. It has a rather wide distribution in Europe, from Scandinavia in the north to Yugoslavia in the south; it is rarely found above the montane vegetation belt.

10 L. stigmatæa (Ach.) Hertel et Leuck.

Syn.: *Lecidea vulgata* Zahlbr.

C - Giara di Gesturi. Leg. W. - M. Arcuentu. Leg. E (TSB).

N - Desulo. Leg. NP (GZU,TSB). - Supramonte di Oliena, 750 m. Leg. W
- Lanusei, with *Lecanora campestris*. Leg. E (GZU). - Esterzili.
Leg. M, f. *egena*. - Arcu Correboi. Leg. E (GZU), M.

S - Capo d' Orso. Leg. M.

Lecidella stigmatæa is a widespread nitrophilous species with a wide ecological amplitude and a worldwide distribution, including all the continents.

11 L. subincongrua (Nyl.) Hertel et Leuck. var. **subincongrua**

C - M. Arcuentu, on siliceous rock. Leg. E (GZU). - P.ta Serpeddi'.
Leg. NP (TSB).

N - M. Mannu. Leg. NP (GZU).

This variety has a very wide distribution in Europe, from the Mediterranean to the Arctic zone. Its range in altitude is from the

lowland (particularly along the coasts) to the alpine belt of the Alps.

12 L. subincongrua var. **elaeochromoides** (Nyl.) Hertel et Leuck.

C - Isola dei Cavoli. Leg. NP (GZU,TSB). - Isola di S. Pietro. Leg. Feige. - M. Arcuentu. Leg. E (GZU,TSB), M. - Capo Pecora. Leg. E (GZU,TSB). - Giara di Gesturi. Leg. W.

O - M. Ferru. Leg. W.

S - P.ta Falcone. Leg. NP (GZU,TSB), W. - S. Teresa di Gallura, on granite near the coast. Leg. E (TSB). - M. Russu, on granite. Leg. E (HbWB) - Capo Orso, on Granite. Leg. E (HbWB).

This variety is easily distinguished from the typical species by the greenish yellow colour of the thallus due to the presence of thiophanic acid and other xanthones (HERTEL & LEUCKERT, 1969). Its distribution seems to be strictly Mediterranean in Europe, from Spain to Greece. In Sardinia it is most common on acid rock outcrops near the coast.

13 L. vorax Leuckert et Poelt spec. nov., ex affinitate Lecidellae subincongruae.

Typus: Sardinia, Prov. Cagliari, Giara di Gesturi, on basaltic rocks. 20.7.1985. Leg. P.L. Nimis et J. Poelt (Holotypus GZU, Isotypi M, TSB, UPS) - Paratypus: Prov. Cagliari, Punta Serpeddi', rocks at the summit, ca. 1000 m 19.7.1985. Leg. P.L. Nimis et J. Poelt (GZU,TSB).

Thalli parasitici, in thallis Lecanorae rupicolae vigentes, insulas efficientes rotundatas ad irregulares, rimosi-areolati areolis demum subpeltatis irregulariter rimosis, pallide ochraceis. Thallis lineis prothallinis atris angustis circumdati. Soralia desunt. Medulla albida. Apothecia adnata, singularia vel compluria confluentia, rotundata ad irregularia, discis planis ad subconvexis atris et marginibus subnitidis demum saepe exclusis. Excipulum modo L. carpathicae constructum hyphis perpendicularibus valde conglutinis fusciscentibus. Hypothecium fuscum. Hymenium incoloratum. Epihymenium coeruleiviride vel demum fuscens. Sporae typice octonae, late ellipsoideae, 11-13 x 6-7 μ m.

Thallus C+ aurantiacus, continet: arthothelinum, dichlorlichenxanthonum, chlorlichenxanthonum, acidum thiophanicum et o-methyldichlorlichenxanthonum. Hypothecium K+ rufescens.

Thallus parasitic on Lecanora rupicola, forming roundish to irregular islands on the host, with thin, black, prothallinic lines at the edges; thallus rimose-areolate, areoles becoming more or less stipitate in old thalli, with irregular rimose surface. Areoles light ochre, C+ orange. No soralia. Apothecia adnate, single or confluent and then very irregular in outline, with black, plane to slightly convex

disc and somewhat nitidous, later often disappearing margin. The apothecia have the structure of those of *Lecidella carpathica*, with brownish excipulum made by conglutinate perpendicular hyphae, ochraceous brown hypothecium which reacts reddish brown with K, and bluish-green epihymenium, changing to brown in older apothecia. Spores 8 or fewer, 11-13 x 6-7 μ m. Chemical compounds: see the diagnosis. In an apothecium of the holotypes we have found also the endohymenial fungus *Arthonia intexta*, with 3-celled spores.

The new species belongs to the group of *Lecidella carpathica* and is chemically close to *Lecidella subincongrua*, from which it differs by the typical parasitic way of life and the ochraceous thalli. The reason for this strange colour is unknown; the pigment was not soluble. Type and paratype are essentially identical. The paratype has younger and therefore smaller thalli, where the parasitic habit is more evident. The hosts, in both collections, are chemically identical, containing atranorin, roccellic acid, sordidone and eugenitol in the apothecia, atranorin and roccellic acid in the thallus. The infection of the hosts starts with densely appressed small areoles which are lined by a thin prothallus. *Lecidella vorax* gives the impression of a typically parasitic species, easy to recognize by the unusual colour. As in most lichens of the island, the thalli are more or less damaged by invertebrates. Just before publication of this book, the species has been collected by one of the authors (Nimis) in central Italy (Latium, Tusculum 700 m): also in this third locality *Lecidella vorax* was clearly parasitic on *Lecanora rupicola*.

72 *Lepraria*

The genus *Lepraria* is presently very poorly understood. We use here the names as given by the collectors, although we think that a correct identification of the material can be achieved only after a revision based on chemical and ultrastructural characters.

1 *L. crassissima* (Hue) Lett.

N - M. Albo. Leg. NP (TSB).

2 *L. incana* auct.

N - M. Arbo. Leg. E (SZU).

S - M. Limbara. Leg. E (GZU).

3 *L. membranacea* auct.

C - M. Arcuentu. Leg. E (TSB). - Santadi. Leg. Tretiach (TSB) - Is

Pauceri. Leg. NP (TSB).

4 **L. neglecta** sensu Vain., non (Nyl.) Lett.

C - P.ta Serpeddi', on Grimmia. Leg. NP (GZU,TSB).

N - P.ta Paulinu, on mosses. Leg. NP (TSB). - Bruncu Spina, on Grimmia. Leg. NP (TSB). - Arcu Correboi. Leg. E (SZU).

S - M. Limbara, on mosses over granite. Leg. E (TSB). - P.so La Variante. Leg. E (SZU).

73 **L e p r o c a u l o n**

1 **L. microscopicum** (Vill.) Gams ex Hawksw.

Syn.: Stereocaulon microscopicum (Vill.) Frey; Stereocaulon nanum (Ach.) Ach.

C - M. Arcuentu. Leg. E (GZU,SZU,TSB).- " In rupibus rimosis Iglesias et in monte Sette Fratelli (Gennari)". (MOD. BAGLIETTO 1879:93, as Stereocaulon nanum). - Cagliari (CANEPÀ 1917:466).

N - Desulo, on soil. Leg. NP (TSB). - P.ta Palai, on soil. Leg. NP (TSB). - Arcu Correboi. Leg. E (GZU,TSB).

S - Nuraghe S. Antine, on thin soil layers in fissures of the rock. Leg. E (TSB).- P.so La Variante. Leg. E (SZU,TSB). - Capo Orso. Leg. E (TSB).- Aggius. Leg. W.

Leprocaulon microscopicum is a lichen with worldwide distribution, mainly centred in the warmer regions of the northern hemisphere. According to BUSCHARDT (1979:227) the species is acidophytic and apparently xerophytic. In Sardinia it is rather common throughout the island on non-calcareous mineral soils, often on walls and other anthropogenous substrates, mostly in niches or similar sites, protected against direct precipitation. In Italy the species is most common in the Mediterranean and submediterranean regions of the country, and becomes progressively rarer northwards towards the southern Alps.

74 **L e p r o p l a c a**

1 **L. xantholyta** (Nyl.) Hue

Syn.: Caloplaca xantholyta (Nyl.) Jatta

N - M. Arcueri. Leg. E (TSB).- M. Albo, on North exposed calcareous rocks. Leg. NP (GZU,TSB).

The validity of this genus seems to us very doubtful; probably the species should be returned to *Caloplaca*; for the time being we follow LAUNDON (1974).

75 *Leptochidium*

1 *L. albociliatum* (Desm.) Choisy

Syn.: *Polychidium albociliatum* (Desm.) Zahlbr.; *Polychidium gennarii* BAGLIETTO 1879: 120.

N - Rio Madau. Leg. W. - Rio Aratu, on epigaeic mosses. Leg. NP (TSB). - Desulo, on mosses. Leg. NP (TSB). - Arcu Correboi. Leg. B. - ibid., with apothecia. Leg. E (GZU,TSB). - Rio Pardu, with *Polychidium muscicola*. Leg. E (GZU). - Laconi. Leg. Gennari. (MOD. BAGLIETTO 1879: 120 as *Polychidium gennarii*)

The distribution of this lichen in Europe can be defined as being more or less Mediterranean-atlantic, but as it is also known from Arctic America and Greenland, this statement is only locally correct. The type material of *Polychidium gennarii* (MOD) corresponds well to *Leptochidium albociliatum*. The white fibrils at the margins of the thallus are somewhat rare, but this may be due to invertebrates, which may have browsed on the thallus.

76 *Leptogium*

Besides the taxa listed below, MAMELI 1920 :161 cites *Leptogium cretaceum* Nyl. from calcareous rocks in the botanical garden of Cagliari. We were unable to check this identification of the original specimen.

1 *L. brebissonii* Mont.

? - A specimen in MOD "ex Sardinia", most probably from the herbarium Moris.

The species, which has a southern subatlantic distribution in Europe, is known also from other parts of Italy, mostly along the western side of the Peninsula (Liguria, Tuscany, Latium).

2 *L. corniculatum* (Hoffm.) Minks

Syn.: *Leptogium palmatum* (Huds.) Mont.

C - Tupa Granella. Leg. Treiach (TSB). - "In sylvis S. Barbara prope Capoterra" (BAGLIETTO 1879:120, as *Obryzum corniculatum*).

N - Aritzo, S. Pietro. Leg. Moris (MOD). - P.ta Palai. Leg. NP (GZU,TSB). - Rio Pardu. Leg. E (GZU).

S - P.so La Variante, on soil, very abundant. Leg. E (SZU,TSB).

The species has a southwestern distribution in Europe; it is known from south Scandinavia (distribution map in DEGELIUS 1935: 63) to Portugal, where it is rather frequent, whilst in central Europe it is rare. It also occurs in the Balkan peninsula where it is very rare (DEGELIUS

1935: 65). In the flora of JATTA (1909-1911) it is cited from the province of Verona, Tuscany and Sardinia. Recent finds (in TSB) indicate that this species is rather common also along the western mountain ranges of Calabria, mostly on soil associated with a siliceous substrate.

3 *L. cyanescens* (Rabenh.) Koerb.

C - M. Sette Fratelli. Leg Canepa (MOD, under *Lethagrium ruginosum*. Here probably also the other localities cited by BAGLIETTO 1879:119, as *Lethagrium ruginosum*: M. Santo di Pula, Orri).

Leptogium cyanescens is another species with subatlantic distribution in Europe (map in DEGELIUS 1935:55). Its European distribution ranges from north Scandinavia to south Portugal to the west and extends to the Carpathian Range to the east. In Italy the species is known from many localities throughout the country as far as Sicily.

4 *L. diffractum* Krempelh. ex Koerb.

S - Tavolara, on limestone. Leg. Brizzi (TSB).

For the possible confusions of *Leptogium diffractum* with small calcicolous species of *Collema* see DEGELIUS 1954.

5 *L. gelatinosum* (With.) Laund.

Syn.: *Leptogium scotinum* (Ach.) Fr.; *Leptogium sinuatum* (Huds.) Massal.

C - Road Arbus-Buggerru. Leg. E (TSB). - Is Pauceri, on epigaeic mosses on acid substrate. Leg. NP (TSB). - "Inter muscos, super truncos Quercuum in monte Santo Pula (Canepa)". (BAGLIETTO 1879:119, as *Leptogium sinuatum*).

N - Arcu Correboi, on epilithic mosses (acid substrate). Leg. E (TSB). - M. Arcueri, on moss. Leg. E (TSB). - Desulo, on mosses. Leg. NP (TSB). - P.ta Palai, on epilithic mosses on acid substrate. Leg. NP (TSB). - M. Albo. Leg. NP (GZU,TSB).

S - Nuraghe S. Antine, on epilithic mosses. Leg. E (TSB).

The species seems to be rather common throughout Sardinia. Some specimens are difficult to separate from *Leptogium lichenoides*. *Leptogium gelatinosum* seems to be more frequent than the latter on acid substrates.

6 *L. lichenoides* (L.) Zahlbr.

C - M. Sette Fratelli. Leg. WP, det. H. Schiman-Czeika.

N - M. Albo, on epigaeic mosses on calcareous substrate. Leg. NP (TSB,GZU). - Rio Aratu, at the base of an old *Castanea*, on moss. Leg. NP (TSB). - M. Arcueri, on moss over limestone. Leg. E (HbWB, TSB). - Padru Mannu (North of Macomer). Leg. WP.

S - P.so La Variante, on mosses (granite). Leg. E (HbWB), det.
H.Schiman-Czeika.

A rather common species, particularly on calcareous substrates. It is very polymorphic with the frequent occurrence of dwarf, pulvinate specimens. Sometimes the lobes are digitate-coralloid at the tips; when individuals are very small the whole thallus has a coralloid appearance and it could be confused with some of the smaller *Leptogium* species belonging to sect. *Homodium*.

7 **L. lichenoides** (L.) Zahlbr. v. **pulvinatum** Zahlbr.

N - Bruncu Spina, on mosses. Leg. NP (TSB).

8 **L. minutissimum** (Flk.) Fr.

N - M. Albo, on moss over calcareous soil. Leg. NP (TSB).

9 **L. plicatile** (Ach.) Leight.

C - "Ad saxa calcarea in horto academico Cagliari (Canepa)". (MOD.
BAGLIETTO 1879:118, as *Collema plicatile*).

A rather distinctive species, growing on bare rock, known from several localities in Italy, from the north to Sicily (specimens in TSB).

10 **L. saturninum** (Dicks.) Nyl.

N - Rio Aratu, on Castanea. Leg. NP (TSB).

11 **L. schraderi** (Bernh.) Nyl.

N - M. Mannu, on calcareous rocks. Leg. NP (TSB).

The species occurs on a variety of substrates. Other collections in Italy (from the north to Latium and Calabria) on rock, soil and sand dunes (specimens in TSB).

12 **L. teretiusculum** (Wallr.) Arn.

N - Lanusei, at the base of an old tree of *Quercus pubescens*. Leg. E (TSB). - P.ta Palai. Leg. E (GZU).

77 **L e t h a r i e l l a**

1 **L. intricata** (Moris) Krog

C - M. Santo di Pula. Leg. Canepa (MOD).

N - M. Ortobene, on granite. Leg. NP (GZU,TSB). - P.ta Palai, on rock. Leg. NP (GZU,TSB). - Laconi. Leg. Gennari (MOD). - Flumini Bina. Leg. Canepa (MOD). - Arcu Correboi. Leg. E (GZU, HbWB, SZU,TSB).

S - M. Limbara, on granite. Leg. E (GZU, HbWB, SZU, TSB). - P.so La Variante. Leg. E (SZU), M.

All of the specimens in MOD are cited by BAGLIETTO 1879: 93 as *Stereocaulon soleirolii*. This characteristic species, which is generally rare in other parts of its range, seems to be rather frequent in Sardinia, especially in the mountains. Other known stations for Italy are: Isola d' Elba, Southern Apennines from M. Pollino (epiphytic on *Pinus leucodermis*) to the Aspromonte, and Sicily (Madonie Mts.). See also KROG (1976).

78 *Lichenoconium*

1 *L. lecanorae* (Jaap) D. Hawksw.

C - Giara di Gesturi. Leg. NP (GZU).

N - P.ta Palai, on *Lecanora subcarnea*. Leg. NP (GZU).

See HAWKSWORTH 1976.

79 *Lichinella*

1 *L. stipatula* Nyl.

C - M. Arcuentu, on basaltic rock. Leg. E (HbWB).

N - Esterzili, with *Placynthium nigrum* and *Collema cristatum*. Leg. E (GZU).

S - Torralba. Leg. E (GZU).

All our collections have been identified by H. Schiman-Czeika.

80 *Lobaria*

1 *L. amplissima* (Scop.) Forss.

C - "Super truncos Quercinos in sylvis montis Sette Fratelli, Santo Pula et Flumini Bina iuxta Orri (Gennari, Canepa)" (BAGLIETTO 1879:65-66, as *Sticta glomulifera*).

N - Rio Aratu, on *Castanea*. Leg. NP (TSB). - P.ta Palai, on *Quercus pubescens*. Leg. B. - "Ad rupes in Monte Santo Torralba et ad corticem arborum Arizzo. Moris" (BAGLIETTO 1879:65-66, as *Sticta glomulifera*). - Tonara, on *Quercus*. (COLOSI 1917:463, as *Ricasolia glomulifera*).

O - M. Ferru. Leg. Feige.

This is an oceanic species ranging from north Scandinavia to south Spain (map in DEGELIUS 1935: 72). In Italy it occurs throughout, mostly

in the lower montane belt, but is becoming rare and it has disappeared over wide areas, especially in the plains of the north. For more details see also SCHAUER 1965: 52.

2 **L. pulmonaria** (L.) Hoffm. var. **meridionalis** (Vain.) Zahlbr.

C - M. Sette Fratelli. Leg. Gennari (MOD). - M. Santo di Pula. Leg. Canepa (MOD), both specimens cited by BAGLIETTO 1879: 66.

N - Rio Aratu, on Castanea and Ilex. Leg. NP (TSB). - P.ta Palai, on Quercus. Leg. NP (TSB), B. - M. Arcueri, on Quercus ilex. Leg. E (GZU,TSB). - M. Arbo. Leg. M , E (HbWB,SZU,TSB). - Tonara, on Quercus and Castanea. (COLOSI 1917: 463).

O - M. Ferru. Leg. B, W, Feige. - Assolo, 450 m, on Quercus pubescens. Leg. WP.

Lobaria pulmonaria is the most frequent species of the genus in Italy; it is still rather common from the north to Sicily, mostly in moist woods of the montane vegetation belt (but there are also recent collections from coastal Latium only a few metres above sea level).

The taxonomic distinction of the forms named var. *meridionalis* in continental Europe is doubtful.

3 **L. scrobiculata** (Scop.) DC.

C - M. Sette Fratelli. Leg. Gennari (MOD). - M. Santo di Pula. Leg. Canepa (MOD). - Iglesias. Leg. Canepa (BAGLIETTO 1879: 66).

N - P.ta Palai, on Quercus. Leg. NP (TSB), B. - see note to *Lobaria virens*. - Orri. Leg. Canepa (BAGLIETTO 1879:66) - Aritzo, Leg. Gennari (BAGLIETTO 1879:66).

O - M. Ferru. Leg. Feige.

S - Budduso', on Quercus suber. (COLOSI 1917:463 as *Lobarina scrobiculata*).

Lobaria scrobiculata is more tolerant of low humidity and high light intensity than *L. virens* and may grow on substrates with a lower pH than other European members of the genus; it grows on bark and acid rock (SEAWARD & HITCH 1982:76). In Europe it is known from north Scandinavia to Spain (see SCHAUER 1965:54) extending south to Macaronesia. In Italy it is known from the north (Southern Alps) to Calabria, but is becoming increasingly rare.

4 **L. virens** (With.) Laund.

Syn.: *Lobaria laetevirens* (Lightf.) Zahlbr.

N? - Sine localitate (MOD).

The same packet also contains *Lobaria amplissima*. This is probably the specimen cited by BAGLIETTO (1879: 65) as "Una cum *Sticta glomulifera* ad corticem arborum in sylvis Arizzo (sic) legit cl. mus Moris." The

species has an oceanic distribution in Europe and it is bound to very humid, old, sheltered, not too cold woods (distribution map in DEGELIUS 1935: 83); there are no recent collections from Italy.

81 *Massalongia*

1 *M. caruosa* (Dicks.) Koerb.

N - P.ta Paulinu, on mosses. Leg. NP (GZU,TSB).

? - Sine nomine et loco ubi reperta extat in herbario Morisiano.
(BAGLIETTO 1879: 68).

This is an Arctic-alpine-subalpine species occurring also in the mountains of southern Europe and Macaronesia. It frequently occurs among mosses by streamsides. In Sardinia it is restricted to the highest mountains (see also HENSSEN 1963).

82 *Melaspilea*

A revision of this probably heterogeneous genus is badly needed.

1 *M. bagliettoana* Zahlbr.

Syn.: *Melaspilea opegraphoides* Bagl., non Nyl.

C - Capoterra, on *Olea* and *Prunus*. Leg. Canepa (MOD, holotypus,
BAGLIETTO 1879: 109). - Cagliari (COLOSI 1917: 470).

2 *M. rhododendri* (Arn.) Almq.

S - M. Limbara, on the exposed roots of *Juniperus*. Leg. E (TSB).

The spores are slightly smaller than the measures given in the original description.

83 *Micarea*

Only a few species of *Micarea* have been collected in Sardinia: the representatives of this genus are easily overlooked. For *Micarea* see the recent revision by COPPINS (1983).

1 *M. demigrata* (Fr.) Hedl.

S - M. Limbara, on *Pinus*. Leg. E (HbWB,SZU).

2 *M. lignaria* (Ach.) Hedl.

Syn.: *Bacidia lignaria* (Ach.) Lett., *Bacidia milliaria* (Fr.) Sandst.

S - M. Limbara, on Juniperus. Leg. E (GZU, SZU, TSB).

3 M. prasina Fr.

N - M. Arbo. Leg. M.

84 Moelleropsis

1 M. nebulosa (Hoffm.) Gyeln.

Syn.: Parmaria nebulosa (Hoffm.) Nyl.

C - Capoterra. Leg. Gennari (MOD, BAGLIETTO 1879: 68).

S - Aggias (2 Km NNE from -). Leg. W.

This is a western species in Europe. It seems to have become much rarer in many parts of its range than formerly. In Italy there are recent collections from Calabria (Leg. Codogno et Puntillo, Cosenza).

85 Muellerella

For this genus of lichenicolous fungi, see HAWKSWORTH 1979. The circumscription of some of its species has to be studied further.

1 M. hospitans Stitzenb.

N - M. Arcueri, in the hymenia of Bacidia rubella. Leg. E (HbWB).

2 M. lichenicola (Sommerf.) D.L. Hawksw.

C - "In Callopisma luteo-alba in finitimis Cagliari (Canepa)".

BAGLIETTO 1879: 122, as Tichothecium pygmaeum erraticum.

According to J. Hafellner (pers. comm.) the specimen cited by BAGLIETTO loc.cit. is Muellerella lichenicola.

3 M. pygmaea (Koerb.) D.L. Hawksw.

N - Arcu Correboi, on Lecidea sp. (similis L. athrocarpae) and Rhizocarpon geographicum. Leg. E (GZU), det. J. Hafellner. - P.ta Palai, on Aspicilia hydrocharis, with the type material of the host. Leg. NP (GZU, TSB).

S - M. Limbara, on cf. Lecidea sp., Rhizocarpon geographicum, Lecanora sulphurata, Lecanora intricata. Leg. E (GZU).

Among our collections, the material on Lecanora intricata from the Monte Limbara appears to be somewhat intermediate between Muellerella pygmaea and Muellerella lichenicola in the definition of HAWKSWORTH 1979:4.

87 *Mycocalicium*

1 *M. parietinum* (Ach. ex Schaer.) D.L. Hawksw.

N - Seui. Leg. E (GZU). - Esterzili. Leg. E (GZU). Det. Hafellner.
According to TIBELL 1975: 56 this species in Europe occurs from the temperate to the northern boreal and upper oroboreal zones; it probably has a circumboreal distribution.

88 *Mycomicrothelia*

1 *M. pachnea* (Koerb.) D.L. Hawksw.

C - Road Arbus- Buggerru, on *Quercus ilex*. Leg. M.
The material is very scanty, so that the identification is not certain.

89 *Nectria*

1 *N. sp.*

S - Capo d' Orso, on *Aspicilia*, material poorly developed. Leg. E (GZU).

90 *Nephroma*

1 *N. bellum* (Spreng.) Tuck.

C - Tupa Granella, on the bole of *Quercus ilex* covered by mosses.
Leg. Tretiach (TSB).

2 *N. laevigatum* Ach.

Syn.: *Nephroma lusitanicum* Schaer.

C - M. Santo di Pula. Leg. Gennari (MOD). - M. Sette Fratelli. Leg. Canepa (MOD). - Orri. Leg. Canepa (MOD). All of the three localities in BAGLIETTO 1879: 55, as *Nephroma lusitanicum*). - Tupa Granella. Leg. Tretiach (TSB).

N - Rio Aratu, epiphytic, with *Lobaria pulmonaria*. Leg. NP (TSB). - P.ta Palai, epiphytic, on *Quercus*. Leg. NP (TSB), B.

O - M. Ferru, 600 m, on the mossy bark of *Quercus ilex*. Leg. B, Feige. - Assolo, 450 m, on *Quercus pubescens*. Leg. WP.

This is a suboceanic species whose European range extends to north Scandinavia and south Spain, east to Greece. In Italy it is still rather common in moist montane forests from the north to Sicily

(distribution map in DEGELIUS 1935: 92).

3 *Nephroma tangeriense* Werner

N - Rio Pardu. Leg. E (GZU).

S - Capo Orso, on inclined surfaces of granitic rocks. Leg. E (GZU,TSB), identification by P.W. James.

For further information on this species we refer to a forthcoming paper by JAMES & WHITE. A further locality in Italy is from coastal Latium (Castelporziano, near Rome rev. P.James, TSB).

91 *Nesolechia*

1 *N. oxyspora* (Tul.) Massal.

N - Desulo, on *Parmelia conspersa*. Leg. NP (GZU). Det. Hafellner.

S - Aggus (2 Km NE from -), on *Parmelia conspersa*. Leg. W. - Capo d' Orso, on *Parmelia conspersa*. Leg. E (GZU).

92 *Niesslia*

1 *N. cladoniicola* D.L. Hawksw. & W. Gams

N - Rio Pardu, on *Cladonia rangiformis*.

The specimen has only a few fruiting bodies, which are hairy, and contain bitunicate asci. They correspond well to the original description, but the spores were not mature. This is the second find of this species (see also HAWKSWORTH 1975).

93 *Normandina*

1 *N. pulchella* (Borr.) Nyl.

N - M. Arbo. Leg. E (SZU).

S - Capo Orso, on *Frullania* growing in a rock fissure (granite). Leg. E (TSB).

This is a subatlantic species in Europe, extending east to the Carpathian Range. It is also known from temperate areas of the southern hemisphere, such as Tasmania, New Zealand and South America (P.W. James, in litt.). It mostly grows on hepatics and on other lichens, especially *Pannaria* and *Parmeliella* spp. In the map published by DEGELIUS (1935: 102) Italy is certainly underrepresented: the species is frequent, and locally even very common throughout the Peninsula, with maximum frequency along its western side, to Calabria; one sample

from Pantelleria is the southernmost known locality in Europe (specimens in TSB). For more details on this species see also SCHAUER 1965:54.

94 Ochrolechia

1 *O. androgyna* (Hoffm.) Arn.

N - M. Arcueri. Leg. M. - Rio Aratu. Leg. NP (TSB). - M. Arbo. Leg. E (SZU).

Ochrolechia androgyna is a widespread Boreal-montane lichen growing on acid substrates.

2 *O. androgyna* var. *saxorum* (Oeder) Verb.

N - M. Ortobene, on granite. Leg. NP (GZU).

S - M. Limbara, on granite. Leg. E (TSB).

The distinctiveness of this taxon is not clear to us. According to VERSEGHY 1962, it should include sorediate forms of *Ochrolechia tartarea*, but the problem is still unresolved nomenclaturally (see HANKO et al. 1985: 174-175). Under this heading we include sorediate, epilithic lichens with thalli which are C+ pale red.

3 *O. arborea* (Krey.) Almb.

N - Rio Aratu, on *Pyrus*. Leg. NP (TSB).

S - P.so La Variante. Leg. E (SZU).

This species is widely distributed in the temperate regions of the northern hemisphere. In Sardinia it is probably restricted to the mountains.

4 *O. balcanica* Vers.

C - Is Pauceris, on *Quercus suber*. Leg. NP (GZU,TSB). - Giara di Gesturi, on *Quercus suber*. Leg. NP (GZU,TSB). - "Ad truncos vetustos *Castanearum* in monte Sette Fratelli, ad cortices *Fici Caricae* prope Iglesias (Canepa)" (BAGLIETTO 1879: 72, as *Lecanora tartarea arborea*).

N - M. Arcueri. Leg. E (TSB), M. - P.ta Palai. Leg. NP (GZU,TSB), B. - Arcu Correboi (2.5 Km NW of-), 1150 m, on *Quercus pubescens*. Leg.B. - M. Arbo, on *Q. ilex*. Leg. E (HbWB,SZU,TSB), M. - Rio Aratu. Leg. NP (GZU). - Seui. Leg. Marcucci (MOD. BAGLIETTO 1879:72). - M. Albo. Leg. Pertot (TSB).

S - P.so La Variante, on *Quercus suber*. Leg. E (GZU,SZU,TSB), M.

The species is widely distributed in the mediterranean area where it is particularly common in the montane belt. It is known from several other

localities in southern Italy (Gargano, M. Pollino, Sila, Aspromonte, Madonie Mts. etc., specimens in TSB) where it often grows in beechwoods.

5 *O. croazalsiana* Clauz. et Vežda

C - Below P.ta Serpeddi'. Leg. NP (TSB).

N - P.ta Palai. Leg. NP (GZU).

After having studied this lichen in the field, we believe, contrary to HANKO et al. 1985:191, that it should be considered as a distinct species, and not as a synonym of *Ochrolechia tartarea*.

6 *O. pallescens* (L.) Massal.

C - Giara di Gesturi, on *Quercus suber*. Leg. NP (GZU,TSB), W. - Arcu Genna Bogai, on *Quercus suber*. Leg. B.

N - Lanusei, on *Quercus ilex*. Leg. E (TSB). - P.ta Palai. Leg. NP (GZU).

S - Tempio Pausania, on *Ulmus*. Leg. E (TSB), M.

Ochrolechia pallescens is a widespread epiphytic lichen with a temperate, suboceanic distribution in Europe. Its distinction from the following species remains unclear to us.

7 *O. parella* (L.) Massal.

C - P.ta Serpeddi'. Leg. NP (TSB). - Below P.ta Serpeddi'. Leg. NP (TSB). - Giara di Gesturi, on rock. Leg. NP (TSB). - M. Sette Fratelli. Leg. WP. - "Iuxta Iglesias, Capoterra, Seui, in monte Santo Pula (Genn., Canepa, Marc.)". (BAGLIETTO 1879:73, as *Lecanora pallescens*). - Isola di S. Antioco. Leg. Brizzi (TSB) - M. Maxias. Leg. Tretiach (TSB). - Rio Is Fonsuas. Leg. Tretiach (TSB).

N - P.ta Palai, on rock. Leg. NP (TSB). - M. Mannu, on rock. Leg. NP (TSB). - Lanusei, on granite. Leg. E (TSB).

S - Nuraghe S. Antine. Leg. E (HbWB,TSB). - Mara. Leg. B. - Anghelu Ruju. Leg. W. - Aggius (2 Km NNE from -) Leg. W. - Stintino, on a wall of phyllitic rocks. Leg. B. - P.so La Variante, on granite. Leg. E (TSB). - M. Limbara. Leg. M.

This species seems to be common throughout Sardinia on siliceous rock from the lowland to the mountains. Its range is mainly centred on western Europe and the Mediterranean area.

8 *O. subviridis* (Hoeg) Erichs.

N - M. Arbo. Leg. M.

This is another species with mainly western distribution in Europe, growing on the boles of old trees in seminatural woods. There are only a few records from Italy, mainly from the western side of the peninsula.

9 O. tartarea (L.) Massal.

N - Rio Pardu. Leg. E (GZU).

S - M. Limbara, on granite. Leg. E (GZU, TSB).

The distribution of this often misidentified species seems to be very irregular and is in need of more study. It has been often confused with *Ochrolechia androgyna*. The distribution pattern in Europe is clearly of a suboceanic type but the lichen seems to be absent from wide areas of northern Europe (HANKO et al. 1985: 191-192). See also note to *Ochrolechia androgyna* var. *saxorum*.

95 O p e g r a p h a

1 O. atra Pers.

C - Capoterra, on Ficus. Leg. Canepa (MOD, BAGLIETTO 1879:108)

N - Orri. Leg. Canepa (BAGLIETTO 1879: 108).

Opegrapha atra is one of the most common species of the genus in Europe. In Sardinia it seems to be rather rare.

2 O. calcarea Turn.

Syn.: *Opegrapha chevallieri* Leight.

C - Buggerru. Leg. M.- Cagliari, ad rupes saxaque calcarea. Leg. Gennari - Isola di S. Simeone. Leg. Canepa (BAGLIETTO 1879: 108).

S - Capo Caccia, on limestone. Leg. NP (GZU).

3 O. conferta Anzi

S - S. Teresa di Gallura, on granite near the coast. Leg. E (GZU), M.

The species is known from several localities in northern Europe, to the northern Mediterranean region.

4 O. diaphora (Ach.) Ach.

C - "Ad Oleas et ad corticem Amygdalorum in viridario academico Cagliari". (BAGLIETTO 1879:108, as *Opegrapha varia diaphora*).

S - "Ad Juniperum phoeniceam in insula Caprera". (BAGLIETTO, loc. cit.) - Tavolara. Leg. Brizzi (TSB).

We have not seen the specimens cited by BAGLIETTO.

5 O. diaphoroides Nyl.

S - P.ta Falcone, on Juniperus. Leg. NP (GZU, TSB).

Opegrapha diaphoroides is a southwestern species in Europe, occurring on smooth bark close to the coast; it is hitherto known from Corsica, the Isles of Hyeres and Western France (CLAUZADE & ROUX 1985: 537), as well as from the Balearic Islands and Spain (LLIMONA 1976: 127).

- 6 **O. lichenoides** Pers.
C - "Ad Opuntias in sepibus S. Bartolomeo Cagliari (Canepa)". (BAGLIETTO 1879:108).
N - M. Arcueri, on Quercus ilex. Leg. E (GZU,TSB). - Esterzili. Leg. E (GZU).
- 7 **O. lithyrga** Ach.
N - M. Arbo, on siliceous rock. Leg. M.
The species is known from several localities in Central and southwestern Europe. There were no previous records from Italy.
- 8 **O. lutulenta** Nyl.
C - Giara di Gesturi. Leg. NP (GZU, TSB).
This epilithic species has been rarely collected in Italy (Liguria).
- 9 **O. mougeotii** Massal.
S - Isola di Caprera. Leg. Pedicino (MAMELI 1920:171; JATTA, Lich. infer. It., III:232, as *O. mougeotii* var. *pisana*). We have not seen the specimen.
- 10 **O. ochrocheila** Nyl.
S - P.ta Falcone, on twigs of Juniperus. Leg. NP (GZU,TSB).
This is a western and northwestern species in Europe. The station in which it was collected is subject to frequent, humid, salt-loaden winds.
- 11 **O. personii** (Ach. ex Gray) Chevall.
C - Buggerru, on limestone. Leg. M, identification not certain.
- 12 **O. rimalis** Pers.
C - "Ad truncos Quercus Ilicis in monte Sette Fratelli (Gennari, Canepa)". (BAGLIETTO 1879:108, as *Opegrapha varia rimalis*); we have not seen the specimen.
- 13 **O. saxatilis** DC. non auct. cfr. CLAUZADE & ROUX 1985:540
N - M. Arcueri, parasitic on Lecanora bandolensis. Leg. E (GZU). - Orani, on limestone, ex herb. Garovaglio. (MAMELI 1920: 171);
We have not been able to check the identification of the specimen cited by MAMELI which could possibly be *Opegrapha trifurcata*..
- 14 **O. trifurcata** Hepp
C - Buggerru. Leg. M.

N - Capo Caccia, on limestone. Leg. NP (TSB). - M. Albo, on north-facing calcareous rocks, in niches. Leg. NP (TSB).

This species is rather frequent throughout Italy: it grows on limestone in shady sites, often associated with *Acrocordia conoidea* and *Bagliettoa pamigerella*. See also note on *Opegrapha saxatilis*.

15 ***O. vermicellifera*** (Kunze) Laund.

N - Rio Aratu, on *Quercus ilex*. Leg. NP (TSB).

A western species, often sterile but easily recognized by the characteristic white pycnidia. In the distribution map by SCHAUER 1965: 65 there is no report from peninsular Italy, where the species, although not frequently, does occur; in Italy it is known from the eastern Alps, coastal Latium and the Tremiti Islands (NIMIS, 1985).

16 ***O. vulgata*** Ach.

C - "Super trabes juniperinas pontium Scaffa et ad veteres Oleae truncos iuxta Cagliari (Canepa)". (BAGLIETTO 1879:108).

We have not seen the specimens, also the interpretation of the name in Baglietto's paper is not clear.

96 ***Pachyphiale***

1 ***P. cornea*** (With.) Poetsch

N - M. Arbo. Leg. E (SZU).

According to SEAWARD & HITCH 1982: 85, this is an old woodland indicator species, primarily of ancient *Quercus* boles, where it occurs intermixed with other species of the Lobarion. It is widely distributed in old woodlands in Europe, but becoming more or less confined to montane forests southwards.

97 ***Pannaria***

1 ***P. conoplea*** (Ach.) Bory

N - M. Arbo, on epiphytic mosses on *Carpinus*. Leg. E (TSB).

For the ecology and distribution of this widespread species see DEGELIUS 1935 (with distribution map) and JOERGENSEN 1978.

2 ***P. ignobilis*** Anzi

Syn.: *Pannaria servitiana* Gyeln.

N - Rio Aratu, on *Castanea*. Leg. NP (GZU, TSB). - P.ta Palai, on *Acer*. Leg. NP (GZU, TSB). - *ibid.*, on *Quercus pubescens*. Leg. B.

P. ignobilis is a Mediterranean-atlantic species endemic to Europe and North Africa (distribution map in JOERGENSEN, 1978: 34). In the Mediterranean region it mostly grows within the lower montane belt. In Italy it is most frequent along the western side of the peninsula (specimens in TSB).

3 *P. leucophaea* (Vahl) Joerg.

Syn.: *Pannaria microphylla* (Sw. ex Westr.) Del.

C – M. Santo di Pula, on rock. Leg. Gennari (BAGLIETTO 1879: 67).

N – Rio Pardu. Leg. E (GZU).

A widespread epilithic species ranging from the Ukraine in the east to Portugal and Ireland in the west, and reaching as far north as Finnmark in Norway (JOERGENSEN, 1978). Its range includes also the temperate-subarctic regions of North America and Asia.

4 *P. mediterranea* C. Tav.

Syn.: *Pannaria microsticta* auct.

N – M. Arcueri, on *Quercus ilex*. Leg. E (TSB). – P.ta Palai, on *Acer* and *Quercus*. Leg. NP (GZU, TSB). – M. Arbo. Leg. E (SZU).

This is another Mediterranean-atlantic species, ranging from Macaronesia to north Norway, and extending eastwards to Greece (distribution map in JOERGENSEN, 1978:47). Its distribution in Italy very much resembles that of *P. ignobilis*.

5 *P. pezizoides* (G.H. Web.) Trevis.

N – P.ta Paulinu, on mosses. Leg. NP (TSB).

This is one of the most common and widespread species of *Pannaria* in Europe; in the south of the continent it always occurs in the mountains. The most southern locality in Europe is from Calabria (Leg. Codogno et Puntillo, Cosenza). It is also known from Macaronesia, Algeria and Uganda (JOERGENSEN 1978:53).

6 *P. olivacea* Joerg.

C – Ruinas. Leg. Marcucci 1866. (JOERGENSEN 1978: 51). – Tupa Granella. Leg. Tretiach (TSB).

? – Without locality, herb. Schleicher (G, JOERGENSEN 1978:51).

P. olivacea is typically a Mediterranean species, ranging from Portugal to Turkey (distribution map in JOERGENSEN, 1978:51). In Italy it is also known from Calabria (Leg. Codogno et Puntillo, TSB).

7 *P. rubiginosa* (Ach.) Bory

C – M. Santo di Pula. Leg. Gennari (MOD, BAGLIETTO 1879: 67).

Pannaria rubiginosa is a suboceanic species in Europe. Its range

includes all continents except Australia and most parts of Oceania. In Europe the species has become very rare in recent times and is probably extinct over most of its former range. A distribution map has been published by DEGELIUS (1935, see also SCHAUER 1965: 67 and JOERGENSEN 1978, 1977).

98 *Parmelia*

The large genus *Parmelia* has been split in many more narrowly defined genera on the basis of characters which at least in part have, in our opinion, no value at generic level. We wait for a critical synopsis of all the genera, and here we maintain *Parmelia* in a larger sense, except for the species of *Parmotrema*.

1 *P. acetabulum* (Neck.) Duby

Syn.: *Melanelia acetabulum* (Neck.) Essl.

C - Iglesias. Leg. Gennari (MOD. BAGLIETTO 1879: 64). - Giara di Gesturi, on *Quercus suber*. Leg. NP (GZU,TSB). - M. Sette Fratelli (MOD). - Arcu Genna Bogai, on *Quercus suber*. Leg. B.

N - Rio Aratu, on *Pyrus* and *Castanea*. Leg. NP (TSB). - S'Arcu de Tascussi, on *Quercus*. Leg. NP (TSB). - Aritzo. Leg. Gennari (MOD. BAGLIETTO 1879:64). - P.ta Palai, on *Quercus pubescens*. Leg. NP (TSB), B. - Seui. Leg. Marcucci (MOD). - M. Albo, on epilithic mosses on limestone. Leg. NP (TSB). - M. Ortobene, on *Populus*. Leg. NP (GZU,TSB). - Bidicolai, on *Genista aetnensis*. Leg. B - Arcu Correboi, on *Quercus pubescens*. Leg. B, E (SZU). - M. S. Giovanni, 1000 m. Leg. E. Pignatti (TSB). - M. Arbo. Leg. E (SZU,TSB), M. - M. Arcueri. Leg. M. - Tonara (COLOSI 1917:464).

S - P.so La Variante. Leg. E (SZU,TSB), M. - Altopiano di Campeda. Leg. B - Ozieri. Leg. E (GZU). - M. Limbara. Leg. E (SZU).

Parmelia acetabulum is a southern and rather eastern species in Europe, extending northwards into central Sweden and southwards into North Africa. In Italy the species is present throughout the country, but it seems to be much more frequent along the eastern side of the Peninsula. In the south it is present within beechwoods in the upper montane belt, and on mosses on calcareous substrates in a form with a lead-grey thallus (several specimens in TSB; distribution map in Italy available from NIMIS, ined.). On the distribution of the species in the Iberian Peninsula see MANRIQUE & CRESPO 1983.

2 *P. caperata* (L.) Ach.

Syn.: *Pseudoparmelia caperata* (L.) Hale; *Flavoparmelia caperata* (L.)

Hale

- C - Giara di Gesturi, on *Quercus suber*. Leg. NP (GZU,TSB). - M. Santo di Pula (MOD). - M. Sette Fratelli. Leg. Moris - "Iuxta Iglesias ad Prunorum corticem" (MOD. BAGLIETTO 1879:64). - Arcu Germa Bogai, on *Quercus suber*. Leg. B. - Santadi. Leg. Tretiach (TSB).
- N - Nuraghe Mereu, near Orgosolo, 700 m, on *Acer*. Leg. E. Pignatti, 25/5/1982 (TSB). - M. Ortobene. Leg. Pertot (TSB).
- O - Assolo, 450 m, on *Quercus pubescens*. Leg. WP. - Cuglieri, on *Quercus* (COLOSI 1917:464).
- S - Aggius, on *Quercus suber*. Leg. W. - Isola della Maddalena. Leg. Vaccari, 3/1855 (MOD). - Capo Orso, on *Quercus ilex*. Leg. E (GZU, SZU,TSB).

A widely distributed, pantemperate species, in Europe extending north up to south-west Norway. In Italy it is one of the most common species of *Parmelia*, occurring throughout the country, from sea level to the lower montane belt. (Distribution map in Italy available from NIMIS, ined.).

3 *P. carporrhizans* Tayl.

Syn.: *Parmelina carporrhizans* (Taylor) Poelt et Vezda

C - M. Sette Fratelli, presso l'antico convento (MOD).

N - M. Arcueri. Leg. E (GZU). - Flumini Bina prope Orri (MOD). - Seui (MOD) - M. Arbo. Leg. E (HbWB,SZU,TSB).

S - P.so La Variante. Leg. E (SZU).

The Italian distribution of this species resembles that of *P. quercina*, with a somewhat higher frequency in the Mediterranean area of the country. The specimens in MOD are cited by BAGLIETTO 1879:63-64.

4 *P. conspersa* (Ehrh. ex Ach.) Ach.

Syn.: *Xanthoparmelia conspersa* (Ehrh. ex Ach.) Hale

C - Road Arbus-Buggerru, on acid rock. Leg. E (TSB). - M. Arcuentu, on basaltic rock. Leg. E (HbWB,SZU,TSB). - "In montibus Santo Pula et Carbonara" (MOD. BAGLIETTO 1879:64).

N - Rio Madau. Leg. W. - Desulo, on rock. Leg. NP (TSB). - Nuoro, on granite. Leg. B. - Dorgali, 25 m. Leg. B. - Seui, on acid rock. Leg. E (TSB). - Circum Seui. Leg. Marcucci (MOD. BAGLIETTO 1879:65). - Tonara (COLOSI 1917: 464). - M. Ortobene. Leg. Pertot (TSB).

S - Aggius (2 Km NNE from -) Leg. W. - Mara. Leg. B. - Isle of Caprera. Leg. Gestro (MOD. BAGLIETTO 1879:64) - P.so La Variante. Leg. E (SZU).

This is a very polymorphic species growing on siliceous rocks with a

very broad ecological amplitude and correspondingly wide world distribution; in Italy the species is common throughout the country, from sea level to the montane belt (with scattered outposts in the alpine belt of the Alps).

5 *P. contorta* Bory

N - P.ta Palai, on *Quercus pubescens*. Leg. NP (TSB). -ibid., on epilithic mosses. Leg. B. - S' Arcu de Tascussi, on *Alnus*. Leg. NP (TSB). - M. Arbo. Leg. E (HbWB, SZU, TSB), M. - Arcu Correboi. Leg.. E (SZU). - M. Ortobene. Leg. Pertot (TSB).

S - M. Limbara. Leg. E (SZU).

Parmelia contorta is a submediterranean species in Europe, restricted to sites with a suboceanic climate (see SCHINDLER 1975). In Italy it is rather rare from the Southern Alps to the Madonie Mountains in Sicily, almost always within moist beech woods.

6 *P. disjuncta* Erichsen

Syn.: *Melanelia disjuncta* (Erichs.) Essl.

N - Arcu Correboi, on acid rock. Leg. E (GZU).

7 *P. elegantula* (Zahlbr.) Szat.

Syn.: *Melanelia elegantula* (Zahlbr.) Essl.

N - M. Ortobene, on *Pinus*. Leg. NP (GZU, TSB). - Arcu Correboi, on *Quercus*. Leg. E (GZU).

S - P.so La Variante. Leg. M.

According to SEAWARD & HITCH 1982: 94, *Parmelia elegantula* is probably circumboreal in the northern hemisphere from temperate to arctic zones, and characteristic of *Abies* forests in the high montane belt of central and southern Europe; however, in southern Central Europe it mostly grows on isolated trees in orchards, very often on *Pyrus*. In Italy there are only a few records of this species, which often has been confused with other *Melanoparmelias*, both from the north and the south (to M. Pollino, Calabria).

8 *P. exasperata* (Ach.) De Not.

Syn.: *Parmelia aspidota* (Ach.) Poetsch; *Parmelia aspera* Massal.; *Melanelia exasperata* (Ach.) Essl.

C - Iglesias (surroundings of -) on *Castanea*. 1/2/1869. Leg. Canepa (MOD). - "Super truncos *Suberis* a S. Barbara prope Capoterra. Leg. Canepa (BAGLIETTO 1879:65). - Arcu Genna Bogai, on *Quercus suber*, 550 m. Leg. WP. - S. Barbara, near Capoterra. Leg. Canepa (MOD).

N - S' Arcu de Tascussi, on *Alnus*. Leg. NP (GZU, TSB). - Lanusei, on

Juglans. Leg. E (TSB).— Villanova Strisaili (3 Km W of—), on Alnus morisii near a river. Leg. B. — P.ta Palai, on twigs of Crataegus. Leg. NP (TSB). — Rio Aratu, on twigs of Prunus. Leg. NP (TSB). — Arcu Correboi (2.5 Km N of—), on Quercus pubescens. Leg. B, E (SZU). — Seui, on twigs of Alnus. Leg. E (TSB). — M. Arbo. Leg. E (SZU). — Tonara (COLOSI 1917: 464).

S — P.so La Variante, on twigs of Quercus suber. Leg. E (SZU,TSB). — ibid., on Pyrus. Leg. M.

A rather frequent species in Sardinia, often colonizing twigs of trees and shrubs in sunny exposed situations. In Italy it is common throughout the country, mostly up to the lower montane belt.

9 P. exasperatula Nyl.

Syn.: Melanelia exasperatula (Nyl.) Essl.

N — S' Arcu de Tascussi. Leg. NP (GZU).

Parmelia exasperatula seems to be rare in Sardinia whereas it is one of the commonest brown Parmelias in northern Italy, from the lowlands to the subalpine belt.

10 P. glabra (Schaer.) Nyl.

Syn.: Melanelia glabra (Schaer.) Essl.

N — Arcu Correboi (2 Km NW of—), on Quercus pubescens. Leg. B.

According to AHTI (1966:46-50) in Europe Parmelia glabra has a distribution centred on the Mediterranean region extending to the southern parts of central Europe. Its total range includes the warm dry areas of North Africa, southern Russia, and California. It often grows in association with Parmelia acetabulum on isolated, moderately nutrient-enriched wayside trees. In peninsular Italy and in Sicily the species is rather frequent, especially in the lowlands and in the lower montane belt, whereas in Sardinia it seems to be surprisingly rare.

11 P. glabratula (Lamy) Nyl.

Syn.: Melanelia glabratula (Lamy) Essl.

N — Arcu Correboi. Leg. E (TSB). — M. Arbo. Leg. E (HbWB,SZU). — M. Arcueri. Leg. E (GZU).

S — M. Limbara. Leg. E (SZU). — ibid., on Pinus. Leg. Pertot (TSB).

In Sardinia the species seems to be confined to mountain areas.

12 P. laciniatula (Flag. ex Oliv.) Zahlbr.

Syn.: Melanelia laciniatula (Flag.) Essl.

N — S'Arcu de Tascussi, on Alnus. Leg NP. (GZU,TSB). — Rio Aratu, on Pyrus. Leg. NP (TSB). — Bidicolai, on Erica arborea. Leg. B. — M. Arcueri. Leg. E (GZU), M. — Arcu Correboi. Leg. E (SZU). — M.

Arbo. Leg. E (SZU).

O - M. Ferru. Leg. B.

S - P.so La Variante, on Pyrus. Leg. M. - ibid., on Quercus suber.

Leg. E (HbWB, SZU). - M. Limbara, on Pinus. Leg. E (HbWB, SZU, TSB).

In Italy this species ranges from the southern Alps, where it is rare, to Sicily. Along the peninsula it is locally abundant only in humid beech woods with *Ilex aquifolium* where it is often associated with *Parmelia elegantula*. Its total range extends from north Africa to southern Scandinavia, but in many areas the species seems to be lacking; the total distribution pattern is not well understood.

13 *P. loxodes* Nyl.

Syn.: *Parmelia isidiotyla* Nyl.; *Neofuscelia loxodes* (Nyl.) Essl.

C - P.ta Serpeddi'. Leg. NP (GZU, TSB).

N - M. Mannu. Leg. NP (GZU). - Rio Pardu. Leg. E (GZU). - Arcu Correboi. Leg. E (TSB).

S - Nuraghe S. Antine, on acid rock. Leg. E (TSB).

Parmelia loxodes and *Parmelia verruculifera*, often considered as subordinate taxa of one and the same species, are, when well developed, rather easy to distinguish. They are distinct chemically and also ecologically, and deserve to be treated as distinct species. *Parmelia loxodes* is very common along the Tyrrhenian coasts of peninsular Italy, mostly below 1000 m from Liguria to Sicily (several samples in TSB), *Parmelia verruculifera* seems to be most frequent at higher altitudes.

14 *P. luteinotata* Steiner

Syn.: *Neofuscelia luteinotata* (Steiner) Essl.

C - P.to S. Stefano, on acid rock. Leg. NP (GZU, TSB). - P.ta Serpeddi', on acid rock. Leg. NP (GZU). - Nora. Leg. NP (GZU).

S - P.ta Falcone, on acid rocks. Leg. W (GZU).

Among the species of the *Parmelia pulla*-group, *Parmelia luteinotata* is easy to distinguish morphologically by the pale lower surface.

15 *P. mexicana* Gyeln.

Syn.: *Xanthoparmelia mexicana* (Gyeln.) Hale

N - M. Limbara. Leg. E (GZU).

The collection has been identified by T. Nash.

16 *P. omphalodes* (L.) Ach.

N - Arcu Correboi, on acid rock and on Juniperus wood. leg. E (HbWB, SZU, TSB). - Bruncu Spina, on rock. Leg. NP (GZU, TSB).

O - M. Ferru. Leg. W.

S - M. Limbara, on granite. Leg. E (GZU, HbWB, SZU, TSB). Also cited

from the same locality by BAGLIETTO 1879:63.

This circumboreal-alpine species frequently occurs in the alpine and subalpine belts of the Alps and the Apennines on acid substrate. The Italian range extends as far south as Sicily (Madonie Mts., TSB).

17 *P. pastillifera* (Harm.) Schub. et Klem.

Syn.: *Parmelina pastillifera* (Harm.) Hale

N - M. Arbo. Leg. E (SZU). - P.ta Palai. Leg. Pertot (TSB).

The species is more hygrophytic than the close relative *Parmelia tiliacea*. In Italy it is known throughout the country, mostly occurring above 600 m.

18 *P. protomatrae* Gyeln.

Syn.: *Xanthoparmelia protomatrae* (Gyeln.) Hale

C - Road Arbus-Buggerru. Leg. E (TSB).

N - M. Ortobene, on rocks. Leg. NP (TSB). - Dorgali, on rock. Leg. B. A poorly known chemical species of the *Parmelia conspersa*-complex. Also known from south Norway. For details see KROG (1978).

19 *P. pulla* Ach. s.lat.

Syn.: *Neofuscelia pulla* (Ach.) Essl.

C - M. Arcuentu, on hard silicates. Leg. E (SZU,TSB).- " Ad rupes varias in montibus Capoterra, Carbonara, Santo Pula, inque Valle Canonica iuxta Iglesias (Marcucci, Canepa)". (BAGLIETTO 1879:65, as *Parmelia dendritica*). - Isola dei Cavoli. Leg. NP (GZU). - Tupa Granella. Leg. Tretiach (TSB). - S. Pantaleo. Leg. Tretiach (TSB).
N - Nuoro, on granite. Leg. B.- M. Ortobene. Leg. NP (TSB). - Desulo. Leg. NP (TSB). - Bidicolai, on granite. Leg. B. - Arcu Correboi, on schists. Leg. B, M, E (GZU,TSB). - Tonara (COLOSI 1917: 464).

O - M. Ferru. Leg. Feige.

S - M. Limbara, on granite. Leg. M. - Capo Orso, on granite. Leg. E (GZU,SZU,TSB), M. - Stintino, on phyllites. Leg. B. - P.so La Variante. Leg. E (GZU,SZU). - Tavolara. Leg. Brizzi (TSB).

This species is fairly common on siliceous rocks throughout Sardinia. *Parmelia pulla* s.lat. has recently been divided into several chemical races, treated by ESSLINGER 1977 as distinct species. Not all of our material has been chemically analyzed so that *Parmelia pulla* is here considered in a broad sense. Only the collections listed below have been chemically analyzed and can be named in a chemosystematically correct way after ESSLINGER, but we do not recognize them as distinct species.

20 *P. pulla* var. *delisei* (Duby) Nyl.

Syn.: *Neofuscelia delisei* (Nyl.) Essl.

C - Costa Verde, on siliceous rocks. Leg. B. Rev. Hafellner.

21 *P. pulla* subsp. *glabrans* (Nyl.) Clauz. et Roux

Syn.: *Neofuscelia glabrans* (Nyl.) Essl.

N - Dorgali, 225 m. Leg. B. Rev. Hafellner.

S - M. della Neula, 350-415 m, on granite. Leg. B. Rev. Hafellner.

22 *P. quercina* (Willd.) Vain.

Syn.: *Parmelia quercina* (Willd.) Hale

C - S. Bartolomeo, near Cagliari. (MOD).

N - Nuraghe Mereu, near Orgosolo, 700 m, on *Quercus ilex*, 25/5/1982.

Leg. E. Pignatti (TSB). - Arcu Correboi, on *Quercus ilex*. Leg. E (TSB). - M. Arbo. Leg. E (SZU, TSB), M.

S - P.so La Variante, on *Pyrus*. Leg. M, E (HbWB, SZU).

Parmelia quercina is a temperate species in Europe. In Italy it was collected in several localities, from the north (mostly under 800 m) to Sicily (to 1400 m in the Madonie Mts, TSB). In contrast with the closely related *Parmelia tiliacea*, *Parmelia quercina* prefers isolated trees (Xanthorion-communities), where it mostly grows on branches in the upper parts of the crowns.

23 *P. saxatilis* (L.) Ach.

C - P.ta Serpeddi'. Leg. NP (TSB). - Carbonia (above -). Leg. Gennari (MOD). - Giara di Gesturi, on *Quercus suber*. Leg. W. - "Ad pedes Quercuum cum Sphaerophoro coralloide sociata in sylvis circa Orri (Gennari, Canepa), sterilis". (BAGLIETTO 1879: 63). - S. Pantaleo. Leg. Tretiach (TSB). - Is Coronas. Leg. Tretiach (TSB).

N - P.ta Palai, on *Quercus pubescens* and on siliceous rock. Leg. NP (TSB), B. - Bruncu Spina, on rocks. Leg. NP (TSB). - Rio Aratu, on Castanea. Leg. NP (TSB). - Arcu Correboi, 1300 m. Leg. WP, E (HbWB, TSB). - Rio Madau. Leg. W. - M. Arbo. Leg. E (SZU), M. - Tonara. (COLOSI 1917:464). - Isili. (COLOSI 1917:464). - M. Ortobene. Leg. Pertot (TSB).

O - M. Ferru. Leg. W, B.

S - M. Limbara, on granite. Leg. E (HbWB, SZU, TSB), M. - ibid., on Pinus. Leg. Pertot (TSB). - P.so La Variante, on *Quercus suber*. Leg. E (HbWB, TSB).

This is an arctic to temperate species, probably circumpolar in both hemispheres. In Italy it is most common within and above the montane vegetation belt, on bark and acid rock, from the Alps to Sicily, and

seems to be slightly more hygro- and acidophytic than its close relative, *Parmelia sulcata*.

24 *P. sinuosa* (Sm.) Nyl.

S - Giave, on mossy rocks (MAMELI 1920:163).

We have not checked this identification. Although *Parmelia sinuosa* is normally epiphytic, in some parts of its range it may also grow on rock. In Italy the species is known with certainty only from a single locality in the Carnic Alps.

25 *P. stygia* (L.) Ach.

Syn.: *Melanelia stygia* (L.) Essl.

N - Bruncu Spina, on acid, hard rock. Leg. NP (GZU, TSB).

Parmelia stygia is an arctic- alpine species. Its Italian distribution goes from the Alps to southern Calabria, with a gap in central Italy, probably due to the lack of suitable habitats, which is acid rock in the subalpine or alpine zones.

26 *P. subaurifera* Nyl.

Syn.: *Melanelia subaurifera* (Nyl.) Essl.

C - Is Pauceri, epiphytic. Leg. NP (TSB). - Giara di Gesturi, on twigs of *Quercus suber*. Leg. NP (TSB).

N - Seui, on *Ulmus*. Leg. E (TSB). - M. Arbo. Leg. M - M. Arcueri. Leg. M. - M. Ortobene. Leg. Pertot (TSB).

27 *P. subrudecta* Nyl.

N - Lanusei, on a wayside tree. Leg. E (TSB).

The species seems to be rarer in Sardinia than in peninsular Italy, where it is even common on isolated trees below 800 m, in associations of the *Xanthorion parietinae*.

28 *P. sulcata* Tayl.

C - Giara di Gesturi, on *Quercus suber*. Leg. NP (TSB).

N - P.ta Palai, on *Quercus pubescens*. Leg. B. - Rio Aratu, on *Pyrus* and *Castanea*. Leg. NP (TSB). - P.ta Palai, on *Quercus*. Leg. NP (TSB). - M. Arbo. Leg. E (HbWB, SZU).

O - Assolo (2 Km S of-), on *Quercus pubescens*. Leg. WP. - Busachi and Paulilatino, on mossy rocks (MAMELI 1920:163, as *Parmelia saxatilis sulcata*).

S - P.so La Variante. Leg. E (SZU). - Nuraghe Loelle. Leg. Pertot (TSB).

This is an ubiquitous species throughout Italy from the lowlands (in the north) to the subalpine belt, often within large conurbations

(Roma, Firenze, Napoli , specimens in TSB). It has a worldwide distribution, probably circumpolar in both hemispheres up to the temperate zones. According to SEAWARD & HITCH 1982: 111, it is "claimed to be the most widely distributed and catholic macrolichen in the world". In Sardinia the species seems to be relatively more frequent in the mountains.

29 *P. taractica* Krempelh. s.lat.

Syn.: *Xanthoparmelia taractica* (Krempelh.) Hale

C - Giara di Gesturi, loosely attached to acid rock. Leg. NP (TSB).
- Tupa Granella. Leg. Tretiach (TSB). - Is Coronas. Leg. Tretiach (TSB).

N - Lanusei, on granite. Leg. E (TSB). - Rio Madau. Leg. W. - Desulo, on raw soil. Leg. NP (TSB). - Nuoro. Leg. B. - Arcu Correboi. Leg. B. - Badde Orca. Leg. Pertot (TSB). - Villanova Strisaili. Leg. B. - Rio Pardu. Leg. E (GZU).

O - Nuraghe Losa. Leg. Feige. - Nuraghe Ruiu. Leg. Feige.

S - Mara, on rock. Leg. B. - P.so La Variante, on granite. Leg. E (SZU,TSB). - Altopiano di Campeda, on granite. Leg. WP.

Parmelia taractica is a very variable species in need of a general revision throughout its European range based on population studies.

30 *P. tiliacea* (Hoffm.) Ach.

Syn.: *Parmelina tiliacea* (Hoffm.) Hale; *Parmelia scortea* Ach.

C - Arcu Genna Bogai, on *Quercus suber*. Leg. B. - Giara di Gesturi, on *Quercus suber*. Leg. NP (TSB). - M. Santo di Pula. Leg. Gennari (MOD). - S. Barbara, near Cagliari, on *Olea*. 12/9/1864 (MOD. BAGLIETTO 1879:63). - M. Sette Fratelli, on *Quercus suber*, 500 m. Leg. WP. - Tupa Granella. Leg. Tretiach (TSB).

N - Nuraghe Mereu, near Orgosolo, 700 m. on *Acer*. Leg. E. Pignatti, 25/5/1982 (TSB). - Rio Aratu, 450 m. Leg. NP (TSB), W. - Arcu Correboi (2 Km NW of-) on *Quercus pubescens* and siliceous rock. Leg. B. - Arcu Correboi. Leg. E (SZU). - Villanova Strisaili, on granite. Leg. B. - P.ta Palai, on *Quercus* and acid rock. Leg. NP (TSB). - ibid. Leg. Pertot (TSB). - Desulo, on epilithic mosses. Leg. NP (TSB). - Rio Pardu, with apothecia. Leg. E (GZU). - M. Arcueri. Leg. M. - M. Arbo. Leg. E (SZU). - Isili (COLOSI 1917: 464).

O - Nuraghe Losa. Leg. Feige.- Assolo (2 Km W of-) on *Quercus pubescens*. Leg. WP.

S - P.so La Variante. Leg. M, E (HbWB,SZU). - Mara. Leg. B. - Aggius (2 Km NNE from -), on *Quercus suber*. Leg. W. - Nuraghe S. Antine, on rock. Leg. E (TSB). - M. Limbara. Leg. E (SZU). - Nuraghe

Loelle. Leg. Pertot (TSB).

Parmelia tiliacea is a common lichen, and probably the most common *Parmelia*, throughout the island. Its European distribution ranges from central Scandinavia to Mediterranean Europe. COLOSI 1917: 464 describes from Tonara the var. *alba*, characterized by a white lower surface and scarce white rhizines. We could not see the typus.

31 *P. tinctoria* Mah. et Gill.

Syn.: *Xanthoparmelia tinctoria* (Mah. et Gill.) Hale

C - Road Arbus-Buggerru, on acid rock. Leg. E (TSB). - M. Arcuentu, on hard silicates. Leg. E (TSB).

N - P.ta Palai, on acid rock. Leg. NP (TSB). - ibid. Leg. Pertot (TSB). - M. Ortobene, on acid rock. Leg. NP (TSB). - Lanusei, on granite. Leg. E (TSB). - Seui. Leg. M, E (HbWB, TSB).

S - Nuraghe S. Antine. Leg. E (TSB). - Torralba. Leg. E (GZU). - Capo d' Orso. Leg. E (SZU).

Within the *Parmelia conspersa* complex, *Parmelia tinctoria* is distinguished by the globular to ovoid isidia, and the presence of norstictic and salazinic acids. Another character which we frequently observed is the high frequency of lobe development in the inner part of the thallus, which give to this species a different appearance from *Parmelia conspersa*. It appears to have a mediterranean-atlantic distribution, with a range extending northwards up to the coast of Norway. It is not rare in Mediterranean Italy.

32 *P. verruculifera* Nyl.

Syn.: *Parmelia glomellifera* (Nyl.) Nyl.; *Neofuscelia verruculifera* (Nyl.) Essl.

C - P.ta Serpeddi'. Leg. NP (TSB). - M. Sette Fratelli. Leg. WP. - M. Arcuentu. Leg. M.

N - Arcu Correboi, on a thin soil layer with sparse mosses over siliceous rock. Leg. B.

S - Capo Orso, on granite. Leg. E (TSB). - P.so del Limbara, on granite. Leg. E (TSB).

See note on *Parmelia loxodes*.

99 *Parmeliella*

1 *P. plumbea* (Lightf.) Vain.

C - Is Pauceri, on *Quercus suber*. Leg. NP (TSB).

N - P.ta Palai, on *Quercus pubescens*. Leg. NP (GZU, TSB), B. - Rio Aratu, very abundant on *Castanea*. Leg. NP (GZU, TSB). - M. Arbo.

Leg. E (SZU).

A species distributed in Europe from Crimea in the east to Portugal in the west, north to northern Norway (JOERGENSEN, 1978). A distribution map is given in DEGELIUS 1935. In Italy the species was most frequent in the western part of the peninsula, mostly between 500-900 (1500) m (JOERGENSEN, 1978, several collections also in TSB) but is becoming increasingly rare.

2 *P. triptophylla* (Ach.) Muell. Arg.

N - M. Arbo. Leg. E (SZU, TSB).

For the distribution and ecology of this species see DEGELIUS 195:24 and JOERGENSEN 1978:75.

100 *Parmeliopsis*

1 *P. ambigua* (Wulfen) Nyl.

S - M. Limbara, on Pinus. Leg. E (SZU).

This boreal species often grows with *Cetraria pinastri*, as in the named locality.

101 *Parmotrema*

The genus *Parmotrema* in Italy has been the subject of a recent revision by COASSINI-LOKAR et al. (1987). Altogether 6 species are present in Italy. Only *P. perlatum* and *P. reticulatum* are known from Sardinia, where they are rather frequent. However, we suspect that *P. hypoleucinum* and *P. stuppeum* should also occur on the island.

1 *P. chinense* (Osbeck) Hale et Ahti

Syn.: *P. perlatum* (Huds.) Hale, *Parmelia perlata* (Huds.) Ach.; *Parmelia trichotera* Hue.

C - Is Paucaris, on *Quercus suber*. Leg. NP (GZU, TSB cum apothecia).
- Under P.ta Serpeddi, on *Quercus ilex*. Leg. NP (TSB). - Giara di Gesturi, on *Quercus suber*. Leg. NP (TSB), ibid., on basaltic rock, Leg. W. - Arcu Genna Bogai, on *Quercus suber*. Leg. B. - M. Sette Fratelli, on *Quercus suber*, 500 m. Leg. WP. - Carbonia, 150 m. Leg. WP. - "Super truncos Quercinos et Ailanti circa Orri (Canepa), in sylvis montanis Santo Pula (Gennari)" (MOD. BAGLIETTO 1879:64). - S. Pantaleo. Leg. Tretiach (TSB).

N - M. Arbo. Leg. E (SZU). - M. Ortobene, on epilithic mosses. Leg. NP (TSB). - ibid. on *Quercus ilex*. Leg. Pertot. - Isili (COLOSI

1979:464).

O - M. Ferru, on *Quercus ilex*. Leg. B, Feige. - Nuraghe Losa. Leg. Feige. - Busachi, on mossy rocks (MAMELI 1920: 162).

S - Aggius (2 Km NNE from-), on *Quercus suber*. Leg. W. - P.so La Variante, on *Quercus suber*. Leg. E (GZU, HbWB, SZU, TSB), M.

P. chinense, formerly called *Parmotrema perlatum* (see HALE & AHTI, 1987) is a widespread, pantemperate species reported from all continents (HALE 1965). It is by far the most common species of the genus in Italy, where it attains maximum abundance along the Tyrrhenian coasts and in the Insubric Region (suboceanic climate). Distribution map in Italy in COASSINI-LOKAR & al.. 1987.

2 *P. reticulatum* (Taylor) Choisy

Syn.: *Parmelia reticulata* Tayl.

C - Giara di Gesturi, on *Quercus suber*. Leg. NP (TSB). - M. Santo di Pula. Leg. Gennari (MOD). - Is Paucaris, on *Quercus suber*. Leg. NP (TSB). - M. Sette Fratelli, 500 m. Leg. WP. - Arcu Genna Bogai, on *Quercus suber*. Leg. WP. - Fluminimaggiore (3 Km NW of-), on *Quercus suber*. Leg. WP.

S - P.ta Falcone, on *Juniperus*. Leg. NP (GZU, TSB). - Capo Orso, on granite. Leg. NP (SZU, TSB). - P.so La Variante, on *Quercus suber*. Leg. E (GZU, TSB).

A more southern and western species in Europe compared with *P. chinense*, formerly occurring also in central Europe but now probably extinct in this area. In Italy it is still present along the Tyrrhenian coasts of the peninsula, where it persists in the few remains of relatively undisturbed vegetation along the coast. In Sardinia the species is still relatively frequent. Distribution map in Italy in COASSINI-LOKAR et al. 1987.

102 *P e c c a n i a*

1 *P. coralloides* Massal.

N - M. Mannu, on steeply inclined rock surfaces. Leg. NP (TSB).

103 *P e l t i g e r a*

1 *P. camina* (L.) Willd. s. str.

C - Is Paucaris, on epigaeic mosses. Leg. NP (TSB).

N - Arcu Correboi. Leg. B. Rev. Vitikainen. - Supramonte di Oliena, det. Vitikainen. Leg. W. - Rio Pardu, det. Vitikainen. Leg. E

(GZU).

O - M. Ferru. Leg. Feige, identification not certain.

2 P. collina (Ach.) Schrad.

Syn.: *Peltigera scutata* (Dicks.) Duby

N - Rio Aratu, on Castanea. Leg. NP (TSB). - P.ta Palai, on Quercus. Leg. NP (TSB), B (Rev. Vitikainen) - Arcu Correboi (2.5 Km NW of-), on Quercus pubescens. Leg. B (Rev. Vitikainen). - M. Arcueri. Leg. E (GZU). - M. Arbo. Leg. E (SZU, TSB), M.

O - M. Ferru. Leg. Feige.

Peltigera collina is a suboceanic species, epiphyte within associations of the Lobarion pulmonariae alliance. Its Italian distribution is from the outer alpine ranges in the north to Sicily; in the south it is most frequent in the montane vegetation belt.

3 P. didactyla (With.) Laund.

Syn.: *Peltigera spuria* (Ach.) DC.

? - "In herbario Morisiano" (BAGLIETTO 1879:56).

Peltigera didactyla, a pioneer species on recently disturbed soil, has a broad, circumboreal range. Although we have not checked Baglietto's specimen, its presence in Sardinia is to be expected.

4 P. horizontalis (Huds.) Baumg.

? - "Inter muscos in sylvis. Moris: non vidi". BAGLIETTO 1879: 55 as *Peltigera horizontalis* (Lin.) Hoff.

The presence of *Peltigera horizontalis* in Sardinia is possible.

5 P. membranacea (Ach.) Nyl.

N - P.ta Palai, on saxicolous mosses. Leg. B, det. Vitikainen.

This species has been often confused with other taxa of the *Peltigera canina*-complex. Its European distribution is not yet clear. For differences towards *Peltigera canina* see THOMSON 1950.

6 P. neckeri Muell. Arg.

N - Supramonte di Oliena, det. Vitikainen. Leg. W. - Tupa Granella. Leg. Tretiach (TSB).

S - P.so La Variante, very abundant on soil and mosses. Leg. E (TSB).

This species belongs to the *Peltigera polydactyla*-complex, which appears to have a rather oceanic distribution in Europe.

7 P. polydactyla (Neck.) Hoffm. s.lat.

C - Is Pauceris. Leg. NP (GZU, TSB).

The specimens are poorly developed, making impossible to assign them to

a particular taxon of the *Peltigera polydactyla*-complex without chemical analysis.

8 *P. praetextata* (Sommerf.) Zopf

C - Tupa Granella. Leg. Tretiach (TSB). - S. Pantaleo. Leg. Tretiach (TSB).

N - M. Arcueri, on soil in *Quercus ilex* wood. Leg. E (TSB), M. - Bruncu Spina, on epigaeic mosses. Leg. NP (TSB). - Supramonte di Oliena, det. Vitikainen, Leg. W.

O - M. Ferru. Leg. W,B (Rev. Vitikainen), Feige.

S - P.so La Variante. Leg. E (TSB).

Peltigera praetextata is perhaps the most common species of the genus throughout Italy, from the Alps to Sicily.

9 *P. rufescens* (Weis.) Humb.

C - Giara di Gesturi. Leg.W. - Orri. Leg. Canepa. (BAGLIETTO 1879: 56).

N - Desulo, on mosses. Leg. NP (TSB). - M. Albo, on calcareous soil and mosses. Leg. NP (TSB).

S - Lago Bidighinzu. Leg. Feige.

Peltigera rufescens is locally frequent on sunny and dry sites throughout Italy from the lowland in the Mediterranean part of the country to the alpine belt of the Alps.

104 *P e l t u l a*

The genus *Peltula* which has the highest diversity in semi-deserts, is poorly known in southern Europe.

1 *P. euploca* (Ach.) Poelt ex Pišut

Syn.: *Heppia euploca* (Ach.) Vain.; *Peltula guepinii* (Del.) Gyeln.

C - M. Arcuentu, on steep, south-facing hard siliceous rocks. Leg. E (GZU, HbWB, TSB), M.- S. Lucia. Leg. NP (TSB).

N - Torre Argentina, on lava. Leg. NP (GZU, TSB).

S - Nuraghe S. Antine. Leg. E (TSB).

Also cited by BAGLIETTO 1879: 71-72 ("Ad saxa vulcanica, in herbario Morisiano: sterilis"), as *Endocarpiscum guepini*. The species is probably rather common on suitable substrates throughout the island.

2 *P. obscurans* (Nyl.) Gyeln.

N - Torre Argentina. Leg. NP (GZU).

A taxon whose general distribution is poorly known.

3 P. patellata (Bagl.) Swinscow et Krog

C - M. Arcuentu, on soil. Leg. E (GZU), det J.M. Egea.

4 P. psammophila (Nyl.) Marton

Syn.: *Solorinaria psammophila* (Nyl.) Poelt ex Ozenda et Clauz.

C - M. Arcuentu, on earth pockets on steep siliceous rocks. Leg. E (TSB).

This is a western lichen, most frequent in western Europe, south to the Canary Islands; it grows on neutral to slightly acid soils in exposed sites, often with *Toninia toepfferi*, *Squamaria concrescens* and *Trapeliopsis wallrothii*.

105 *Pertusaria*

The genus *Pertusaria* is very well represented in Sardinia: we have collected a number of otherwise very rare species, including some taxa that are probably new and are not described in this paper; for the identification we often referred to DIBBEN 1980 and HANKO 1983.

1 P. affinis Erichs.

N - M. Arbo, on siliceous rock, close to a creek. Leg. E (TSB).

This species, described from a specimen collected in Liguria, was known only from the locus classicus and from the province of Verona (ERICHSEN 1936:629). It is very similar to *Pertusaria amara*, but has no bitter flavour, and to *P. albescens* var. *subflotowiana*, but reacts K, KC and C+ yellow, the soralia P+ faint orange.

2 P. albescens (Huds.) Choisy et Wern. v. *albescens*

C - Ciri Foddi, on *Quercus suber*. Leg. NP (GZU). - Is Pauceris, on *Quercus suber*. Leg. NP (TSB).

N - S'Arcu de Tascussi, on *Quercus*. Leg. NP (TSB). - Rio Aratu, on *Castanea*. Leg. NP (TSB). - Rio Pardu, on *Parmelia* sp. Leg. E (GZU).

- M. Arcueri, on wood. Leg. E (GZU, TSB). - Arcu Correboi. Leg. E (SZU). - M. Arbo. Leg. E (SZU). - Isili (COLOSI 1917: 468 as *Pertusaria variolosa*). - M. Albo. Leg. Pertot (TSB).

S - M. Limbara, on wood. Leg. E (GZU).

The species is rather frequent in Sardinia although it seems to be restricted to sites with high humidity, either in the mountains or in narrow, sheltered lowland valleys.

3 P. albescens var. *corallina* Zahlbr.

N - M. Albo, on moss, identification not certain. Leg. NP (GZU). -

M. Arcueri, on moss. Leg. E (GZU).

The material seems to represent something more than a strong modification of *Pertusaria albescens*, perhaps a distinct taxon.

4 *P. albescens* var. *subflotowiana* (Erichs.)

Syn.: *Pertusaria globulifera* (Turn.) Massal. v. *subflotowiana* Erichs.

N - Bosa, on liparitic rock. Leg. B. - Arcu Correboi, on acid rock. Leg. E (TSB).

The taxonomic status of this variety is not clear to us.

5 *P. amara* (Ach.) Nyl.

C - Ciri Foddi, on *Quercus suber*. Leg. NP (TSB). - Giara di Gesturi, on *Quercus suber*. Leg. NP (GZU, TSB), W. - Arcu Genna Bogai, on *Quercus suber*. Leg. B. - Cagliari (COLOSI 1917: 468). - Orri (MOD. BAGLIETTO 1879 as *Pertusaria communis variolosa*) - Tupa Granella. Leg. Tretiach (TSB)..

N - Lanusei, on *Quercus pubescens*. Leg. E (TSB). - Arcu Correboi, on *Quercus ilex*. Leg. E (TSB). - M. Arcueri. Leg. M, E (TSB) - M. Arbo. Leg. E (TSB).

S - Aggius (2 Km NNE from -), on *Quercus suber*. Leg. W.

In Sardinia this species is as common as *Pertusaria albescens*, and seems to have similar ecological requirements.

6 *P. amara* var. *flotowiana* (Flk.) Erichs.

S - Nuraghe S. Antine, on rock. Leg. E (TSB).

We doubt whether these saxicolous "varieties" are really of any taxonomical status.

7 *P. amarescens* Nyl.

C - Is Pauceri, on hard metamorphic rocks.

This species is very closely related to *Pertusaria amara*. The only differences are its only weakly bitter flavour and a yellowish KC + reaction of the thallus. Until now it was only known from Italy (Province of Verona, Sicily; ERICHSEN 1936: 577).

8 *P. apennina* Bagl.

C - S. Lucia. Leg. NP (GZU).

N - Rio Aratu. Leg. NP (GZU). - P.ta Palai. Leg. WP.

This epilithic species was originally described from northern Italy (Liguria), where it was on serpentine. Our material corresponds well with the description. It is also cited by MAMELI 1920: 168 from Giave but we have not been able to check this identification.

- 9 **P. caesia** (Flot.) Nyl.
C - Is Pauceri. Leg. NP (GZU).
The species is probably identical with *Pertusaria corinthiaca* Erichs. and *Pertusaria ilicicola* Harm.; though widespread, it is rare in the Mediterranean area (HANKO 1983:91).
- 10 **P. chiodectonoides** Erichs.
C - M. Sette Fratelli. Leg. WP.
N - M. Ortobene, on acid rocks. Leg. NP (GZU).
A species described from Sweden with very scattered distribution in Europe. It grows mainly on serpentine.
- 11 **P. conglobata** (Ach.) Fr.
S - Capo d' Orso. Leg. M, E (GZU).
This is, to our knowledge, the only published collection of this very old species besides that of the type specimen. Our specimens were on steep granite rocks. The species was originally described from France (without locality). See also HANKO 1983:65.
- 12 **P. constricta** Erichs.
C - Ciri Foddi, on *Quercus suber*. Leg. NP (GZU).
The species is mostly known from central Europe.
- 13 **P. corallina** (L.) Arnold
S - M. Limbara. Leg. E (SZU), M.
The distribution of this boreal-montane species in the Mediterranean area is poorly known.
- 14 **P. dalmatica** Erichs.
C - Is Pauceri. Leg. NP (GZU).
N - Rio Aratu. Leg. NP (GZU).
The circumscription and distribution of this rarely collected species are little known. It is possible that more than one species is involved.
- 15 **P. dealbescens** Erichs.
Syn.: *Pertusaria leucosora* auct., non Nyl.
C - Tupa Granella, on hard, weakly inclined siliceous rocks. Leg. Tretiach (TSB).
N - Desulo. Leg. NP (GZU).
For the details on the chemotaxonomy of this poorly known, perhaps non-homogeneous species, see HANKO 1983:165.

16 *P. excludens* Nyl.

C - M. Arcuentu. Leg. E (GZU). - S. Lucia. Leg. NP (GZU). - P.ta Serpeddi'. Leg. NP (GZU).

N - Rio Pardu. Leg. E (GZU).

S - M. Limbara. Leg. E (GZU).

We have doubts about the uniformity of this rarely collected taxon. Its distribution is also very poorly known.

17 *P. flavida* (DC.) Laund.

Syn.: *Pertusaria lutescens* (Hoffm.) Lamy

C - Is Pauceris. Leg. NP (GZU). - Giara di Gesturi, on *Quercus suber*. Leg. NP (TSB).

N - P.ta Palai. Leg. NP (GZU,TSB).

S - P.so La Variante, on *Quercus suber*. Leg. E (GZU,TSB).

A more or less subatlantic species of Europe and Macaronesia. Rather frequent on isolated trees throughout Mediterranean Italy, especially in the western part of the peninsula.

18 *P. flavicans* Lamy

C - Is Coronas. Leg. Tretiach. (TSB).

N - Desulo. Leg. NP (GZU). - M. Arbo. Leg. M, E (TSB).

This species, which, in other parts of its range, has a very wide altitude range, seems to be restricted to the mountains in Sardinia.

19 *P. graeca* Erichs.

N - P.ta Palai. Leg. NP (GZU).

According to HANKO 1983:182, *Pertusaria graeca*, described from the isle of Skyros (Greece) has been mostly misunderstood. He has seen only the type material; all other specimens were wrongly identified. Our collection, which gives a P+ red reaction and appears to contain fumarprotocetraric acid, is the third find of this taxon, which is also known from Corsica (WERNER 1974). *Pertusaria graeca* may be an eumediterranean species.

20 *P. hemisphaerica* (Flk.) Erichs.

C - Giara di Gesturi, on *Quercus suber*. Leg. NP (TSB). - Is Pauceris, on *Quercus suber*. Leg. NP (TSB). - Rio Is Faneuas, on *Quercus ilex*. Leg. Tretiach (TSB).

N - Desulo. Leg. NP (GZU). - M. Arbo. Leg. E (SZU).

According to SEAWARD & HITCH 1982:122, *Pertusaria hemisphaerica* is a common and widespread species of the deciduous woodland zone from Norway southwards, except in the more polluted regions of the north European plain; in Sardinia the species is probably restricted to sites

at higher altitudes.

21 P. hyemaea (Ach.) Schaer.

Syn.: *Pertusaria wulfenii* DC.

C - Is Pauceris, on *Quercus suber*. Leg. NP (TSB). - Iglesias, on *Castanea*, M. Sette Fratelli, S. Barbara (BAGLIETTO 1879:88).

N - S'Arcu de Tascussi. Leg. NP (GZU,TSB). - Rio Aratu, on *Castanea*. Leg. NP (TSB). - M. Arcueri, on *Quercus ilex*. Leg. E (TSB). - Bosa, on liparitic rock. Leg. B.

This species is rather common in the Mediterranean and submediterranean regions of Italy, from the north to Sicily.

22 P. lactea (L.) Arnold

C - Road Arbus-Buggerru, on hard metamorphic rocks. Leg. E (TSB). - Santadi. Leg. Tretiach (TSB).

23 P. leioplaca DC.

N - Lanusei. Leg. Marcucci. (BAGLIETTO 1879:89).

If *Pertusaria leioplaca* ad *Pertusaria leucostoma* were considered to be the same species, the oldest name would be *Pertusaria leucostoma*.

24 P. leptospora Nitschke ex Lahm

C - M. Sette Fratelli, on *Castanea*. Leg. Canepa (MOD. BAGLIETTO 1879:90, as *P. multipuncta*).

N - Tonara, on *Castanea*. (COLOSI 1917: 468, as *Pertusaria multipuncta*).

We have not seen the specimen cited by COLOSI. The occurrence of this subatlantic species in the mountains of Sardinia is possible.

25 P. ~~marosa~~ Hamm.

C - P.ta Serpeddi. Leg. NP (GZU). - Below P.ta Serpeddi'. Leg. NP (GZU,TSB).

N - M. Ortobene. Leg. NP (GZU).

S - Capo d' Orso. Leg. M. - M. Limbara. Leg. E (GZU,TSB). - P.so La Variante. Leg. E (GZU).

In the localities in the Province of Sassari a sorediate and a non-sorediate morphotype have been collected growing side by side. The taxonomy of this complex needs further studies.

26 P. melanochlora (DC.) Nyl.

C - Isola dei Cavoli. Leg. NP (GZU). - Is Coronas. Leg. Tretiach (TSB).

N - Bosa, on liparitic rock. Leg. B.

Also cited by BAGLIETTO 1879:89 from "in saxis insulae S. Pietro et

Pula. Moris - Ad rupes in montibus supra Orri et circum Pula (Canepa), iuxta Carbonara (Gennari)". We have not seen the cited specimens. *Pertusaria melanochlora* is, according to our observations, very similar to *Pertusaria mammosa*, from which, however, it can be easily distinguished by the different chemical reactions.

27 *P. pertusa* (Weig.) Tuck.

C - Is Pauceris, on *Quercus suber*. Leg. NP (GZU,TSB). - Costa Verde, on *Juniperus macrocarpa*. Leg. B. - Giara di Gesturi, on *Quercus suber*. Leg. NP (TSB). - P.ta Serpeddi'. Leg. NP (GZU). - M. Sette Fratelli, 500 m. Leg. WP. - M. Santo di Pula, M. Sette Fratelli, Iglesias, Domusnovas, Leg. Canepa (BAGLIETTO 1879:89, as *Pertusaria communis*).

N - Cala Gonone, on *Quercus ilex*. Leg. W. - Rio Aratu, on *Castanea*. Leg. NP (TSB). - M. Arcueri, on *Quercus ilex*. Leg. E (GZU,TSB), M. - P.ta Palai, on *Quercus pubescens*. Leg. NP (TSB), B. - Arcu Correboi, on *Juniperus*. Leg. E (TSB). - M. Arbo. Leg. E (SZU,TSB). - Seui. Leg. Marcucci (BAGLIETTO 1879:89 as *Pertusaria communis*). - M. Ortobene. Leg. Pertot (TSB).

S - P.so La Variante, on *Quercus suber*. Leg. E (GZU,TSB).

The morphotypes of these collections from Sardinia correspond mostly to *Pertusaria pertusa* var. *meridionalis* Zahlbr. The taxonomic status of this variety is not clear to us.

28 *P. pertusa* var. *rupestris* (DC.) DT. & S.

C - M. Sette Fratelli, M. Santo di Pula. (BAGLIETTO 1879:89).

N - Arcu Correboi, on acid rock. Leg. E (TSB). - Seui. (BAGLIETTO 1879:89).

S - Capo Orso, on granite. Leg. E (GZU,SZU). - S. Teresa di Gallura, on granite along the coast. Leg. M. - M. Russu, on granite. Leg. E (TSB).

This taxon is closely related to *Pertusaria pertusa* s.str. We have some doubts about the taxonomic status of this variety, which simply seems to include saxicolous specimens of *Pertusaria pertusa*, often treated as a distinct species. As in this case there may actually be a genetical base for the ecological difference, we prefer to bestow this lichen with the rank of a variety. In the nomenclature we follow SANTESSON 1984: 238.

29 *P. pseudocoralina* (Liljeblad) Arnold

C - Giara di Gesturi. Leg. NP (GZU). - P.ta Serpeddi. Leg. NP (GZU,TSB).

N - Rio Pardu. Leg. E (GZU). - S' Arcu de Tascussi, on acid rock.

Leg. NP (TSB). -Desulo. Leg. NP (GZU). - Bruncu Spina. Leg. NP (TSB).
An epilithic species of the mountains of central and southern Europe;
according to WIRTH 1972:142 it has a submediterranean-subatlantic
distribution pattern.

30 *P. rupicola* (Fr.) Harm. var. *rupicola*

C - M. Arcuentu. Leg. M.

N - Rio Pardu, on acid rock. Leg. E (GZU). - Torre Argentina. Leg.
NP (TSB).

S - Capo Orso, on granite. Leg. E (GZU, TSB).

Pertusaria rupicola is a Mediterranean species. It is not certain
whether all thalli are capable of forming isidia or not. Most of the
larger collections we have from the island are partially isidiate. The
species should be studied in more detail.

31 *P. rupicola* var. *coralloidea* (Anzi) Croz.

C - P.ta Serpeddi'. Leg. NP (TSB). - M. Arcuentu. Leg. E (GZU). - "Ad
rupes graniticas in Monte Santo Pula (Genn., Canepa), Montevecchio
(Marc.)" (BAGLIETTO 1879:88).

N - Arcu Correboi, on acid rock. Leg. M, E (TSB). - Bidicolai, on
granite. Leg. B. - Rio Pardu. Leg. E (GZU).

S - P.so La Variante. Leg. M. - P.ta Falcone. Leg. Pertot (TSB).

See note on the previously cited taxon.

32 *P. slesvicensis* Erichs. cf.

N - P.ta Palai, on *Acer monspeliensis*. Leg. NP (GZU), B. - M.
Ortobene, on *Quercus ilex*. Leg. Pertot (TSB).

Our specimens correspond well with *Pertusaria melanochlora*, but were on
bark. We are not certain whether this is typical *Pertusaria*
melanochlora or a different, corticolous taxon.

106 *P e t r a c t i s*

1 *P. clausa* (Hoffm.) Krenpelh.

N - M. Albo, on north-facing calcareous rocks. Leg. NP (TSB).

S - Capo Caccia, in niches in calcareous rocks. Leg. NP (TSB).

2 *P. thelotremella* (Bagl.) Veřda

C - "Ad rupes calcareas in viridario academico et pone plateam
armorum Cagliari" Leg. Canepa (MOD, holotypus. BAGLIETTO 1879:
87, as *Gyalecta thelotremella* Bagl.).

This is a typical Mediterranean species, distributed from Portugal to

Greece, which grows on steep, sheltered, generally calcareous rocks (VEZDA 1965).

107 "Pharcidia"

The genus *Pharcidia* is illegitimate. Because the following taxa have not yet been studied and given a legitimate nomenclature, we list them here as taxa belonging to *Pharcidia*.

1 *P. calcariae* (Flag.) f. ~~macrospora~~ Vouaux

C - M. Arcuentu, in the apothecial disk of *Aspicilia* sp. Leg. E (GZU), det. Hafellner.

This lichenicolous fungus seems to be an independent species whose generic position and nomenclature still need to be defined. The fungus has protruding perithecia and large, two-celled spores.

2 *P. microspila* var. *pertusariae* B. de Lesd.

N - M. Arcueri, on *Pertusaria pertusa* on *Quercus ilex*. Leg. M.

108 *Phlyctis*

1 *P. agelaea* (Ach.) Flot.

C - "Ad corticem *Ceratoniae* et *Pruni Cerasi* in Cioffa prope Cagliari (Canepa). (BAGLIETTO 1879: 90). - S. Pantaleo. Leg. Tretiach (TSB). - Rio Is Fonsuas. Leg. Tretiach (TSB).

N - P.ta Palai, on *Quercus ilex*. Leg. NP (GZU,TSB). - M. Arcueri, on *Quercus ilex*. Leg. E (GZU, TSB). - M. Arbo. Leg. E (HbWB,SZU). - Seui. Leg. Marcucci (MOD. BAGLIETTO 1879:90).

This submediterranean-subatlantic species seems to be declining rapidly everywhere in Europe, especially in the northern part of its range. It is still widespread, though not common, in the Mediterranean area, particularly in the mountains.

2 *P. argena* (Ach.) Flot.

C - Road Arbus-Buggerru, on *Quercus ilex*. Leg. M.

N - M. Arbo, on *Carpinus* in an old forest near a creek. Leg. E (SZU,TSB).

A species which is perhaps more resistant to air pollution than *Phlyctis agelaea*. In Sardinia it appears to be rare and probably restricted to the mountains.

109 P h o m a

1 *P. cytospora* (Vouaux) D.L. Hawksw.

S - M. Limbara, on *Parmelia omphalodes*. Leg. E (GZU).

2 *P. sp.*

S - M. Limbara, on *Ramalina polymorpha*. Leg. E (GZU).

Possibly this is a not yet described taxon. The fungus was growing on the thallus, not on the apothecial discs.

110 P h y s c i a

1 *P. adscendens* (Fr.) H. Oliv.

C - "Ad *Opuntias circum* Cagliari (Gennari)". (MOD. BAGLIETTO 1879:61, as *Hagenia tenella*). - Road Arbus-Buggerru. Leg. E (SZU).

N - M. Arbu. Leg. M. - Between Cala Gonone and Dorgali, on *Quercus ilex*. Leg. B. - Bidicolai, on *Genista aetnensis*. Leg. B. - M. Ortobene, on *Populus*. Leg. NP (TSB). - Seui. Leg. M.- *ibid.*, on *Genista*. Leg. Marcucci. (MOD. BAGLIETTO 1879:61) - Rio Pardu, on rock. Leg. E (GZU). - Arcu Correboi. Leg. E (SZU).

O - M. Ferru, on *Quercus ilex*, 600 m. Leg. B.

S - Stintino, on rock. Leg. WP. - SS. Trinita' di Saccargia, on *Prunus* and *Ulmus*. Leg. E (TSB). - Badesi Mare, on *Juniperus*. Leg. E (TSB). - Tavolara. Leg. Brizzi (TSB). - Lago di Baratz. Leg. Pertot (TSB).

A common species on sunny boles and twigs throughout the island; it also grows on rock where the nutrient status is high. We observed it in several other localities.

2 *P. aipolia* (Humb.) Fuernrohr

C - Arcu Genna Bogai, on *Quercus suber*. Leg. WP. - Carbonia, on *Quercus pubescens*. Leg. WP.- Giara di Gesturi, on *Quercus suber*. Leg. NP (TSB), W. - Tupa Granella. Leg. Tretiach (TSB).

N - Rio Aratu. Leg. NP (TSB), W. - S'Arcu de Tascussi, on *Quercus*. Leg. NP (TSB). - Lanusei. Leg. M.- M. - Arcueri, on *Ulmus*. Leg. E (HbWB, TSB). - Seui, on *Ulmus*. Leg. E (TSB). - Arcu Correboi. Leg. E (SZU). - Tonara (COLOSI 1917:465). - M. Arbo. Leg. E (TSB). - P.ta Palai. Leg. Pertot (TSB).

O - M. Ferru, on *Quercus ilex*. Leg. B.

S - SS. Trinita' di Saccargia, on *Prunus*. Leg. E (TSB). - Altopiano di Campeda, on *Ulmus*. Leg. B.

Most of the samples of this species cited by BAGLIETTO 1879:61 (as

Hagenia stellaris), are either Physcia aipolia (Orri, Iglesias, Capoterra) or Physcia biziana (specimens in MOD). The species seems to be rather frequent in Sardinia.

3 P. albinea (Ach.) Nyl. em. Frey

Syn.: Physcia albonigra (Schleich.) DT. et S.

N - P.ta Paulinu. Leg. NP (GZU,TSB).

Physcia albinea was hitherto known from several localities of the Alps (FREY 1963: 433). The taxonomy of the saxicolous representatives of the Physcia stellaris complex needs further study.

4 P. biziana (Massal.) Zahlbr.

C - Barumini, a type with densely pruinose thallus. Leg. NP (GZU,TSB). - M. Arcuentu, on siliceous rock. Leg. E (GZU). - "Ad Ficus Caricas, Pula, Scaffa prope Cagliari... ad Ceratoniae Capoterra (Canepa)" (MOD. BAGLIETTO 1879:61 as Hagenia stellaris).

N - Desulo, on metamorphic siliceous rock. Leg. NP. (GZU,TSB). -

Nuoro, on Ficus carica. Leg. B. - Aritzo, on Ulmus. Leg. NP (TSB).

O - Nuraghe Losa. Leg. Feige.

S - Tavolara. Leg. Brizzi (TSB).

Physcia biziana, originally described from Dalmatia, is a chiefly southern species in Europe. In North America it occurs in the West, from Washington to Mexico (THOMSON 1963). There are only few records of this species from Italy (Liguria, Trieste, Castelporziano), probably due to previous confusion with Physcia aipolia (see NIMIS 1982). The species is a complex of different, closely related microspecies, whose taxonomic status is not yet always clear. Var. aipolioides Nadv., overlooked for a long time, is widespread in the Pannonian area, in Czechoslovakia, Austria and Hungary (for the occurrence in the city of Vienna see CHRIST & TÜRK 1984). Var. biziana is widespread and locally common in the Mediterranean area; var. leptophylla, which we prefer to maintain at varietal rank, is also Mediterranean.

5 P. biziana (Massal.) Zahlbr. var. **leptophylla** Vežda

Syn.: Physcia rondoniana Clauz. et Vezda

C - M. Arcuentu. Leg. E (SZU). - Rio Alino. Leg. Tretiach (TSB).

N - Rio Pardu, on siliceous rock. Leg. E (GZU).

S - Ozieri, on wayside trees (Ulmus). Leg. E (GZU, HbWB, TSB).

6 P. biziana (Massal.) Zahlbr. var. **phyllidiata** ined.

S - Nuraghe S. Antine. Leg. E (GZU, HbWB, TSB).

This relatively large lichen, which is distinctly phyllidiate, is also known from Austria, where it grows on steep volcanic rocks below the

castle of Riegersburg (Steiermark).

7 P. caesia (Hoffm.) Fuernrohr

C - Flumini-Bina, on basaltic rock. Leg. Canepa (BAGLIETTO 1879:61 as *Hagenia caesia*).

O - Paulilatino, on limestone. (MAMELI 1920:164); we did not see the specimen.

The record by COLOSI 1917:465 from Isili, on trees, is almost certainly a misidentification, since the species is almost constantly epilithic. It is possible that the cited collections, which we have been unable to check, belong to other species (e.g.: *Physcia wainioi*, *Physcia dubia*).

8 P. ciliata Hoffm.

N - M. Arcueri. Leg. M. - Seui, on wayside trees, with *Physcia orbicularis*. Leg. E (SZU).

9 P. dimidiata (Arnold) Nyl.

C - Road Arbus-Buggerru, on *Quercus suber*. Leg. E (GZU).

10 P. dubia (Hoffm.) Lett.

Syn.: *Physcia teretiuscula* (Ach.) Lynge

N - Bruncu Spina, at the top of an isolated boulder. Leg. NP (TSB).

In our opinion, *Physcia dubia* comprises several taxa and is worthy of further study.

11 P. hirsuta Mereschk.

S - S. Teresa di Gallura. Leg. E (GZU). - M. Mannu, on steep north-facing rocks. Leg. NP (TSB).

12 P. orbicularis (Neck.) Poetsch

C - Barumini, on *Prunus*. Leg. E (GZU,TSB). - Road Arbus-Buggerru. Leg. E (SZU). - Portixeddu. Leg. E (SZU).

N - Aritzo. Leg. NP (GZU,TSB). - M. Ortobene, on *Populus*. Leg. NP (GZU,TSB). - Seui, on *Ulmus*. Leg. E (GZU,SZU,TSB), M. - Esterzili. Leg. M. - M. Arcueri, on *Acer*. Leg. E (TSB), M.

S - SS. Trinita' di Saccargia, on *Ulmus*. Leg. E (TSB). - Altopiano di Campeda, on *Ulmus*. Leg. B.

Rather common on isolated trees throughout the island. Most frequent at altitudes between 600 and 1000 m.

13 P. pusilloides Zahlbr.

Syn.: *Physcia pusilla* Mereschk., non Massal.

N - M. Arcueri, with *Caloplaca sarcopidoides*. Leg. M.

S - Altopiano di Campeda. Leg. B.

This species seems to have a submediterranean-suboceanic distribution pattern in Europe. It is known from the Alps and the Carpathian Range (distribution map in SCHAUER 1965:96).

14 P. sciastra (Ach.) DR.

C - M. Arcuentu, on rock. Leg. E (TSB).

15 P. scopulorum (Lamb. et Vežda) Poelt et Nimis comb. nov.

Basion.: *Physcia aipolia* (Ehrh. ex Humb.) Hampe subsp. *scopulorum* Lamb. et Vežda in A. VEŽDA Lich. Sel. Exs. 861, 1970.

C - Isola dei Cavoli. Leg. NP (GZU). - M. Arcuentu. Leg. E (GZU, TSB).

S - Capo d' Orso, on granite. Leg. E (HbWB, TSB), M.

Physcia scopulorum is, in our opinion, a distinct species differing from *Physcia aipolia* in spore-type and ecology. The habit is somewhat similar to that of larger thalli of *Physcia caesia* but *P. scopulorum* lacks soralia. The species is only known from Corsica and Sardinia.

16 P. semipinnata (Gmel.) Moberg

Syn.: *Physcia leptalea* (Ach.) DC.

C - Giara di Gesturi, on the twigs of shrubs. Leg. NP (TSB). - Is Paucerus, on *Pyrus*. Leg. NP (TSB). - Portixeddu. Leg. E (SZU, TSB), M. - "Ad Ficus Caricas Pula et in Prunorum, Castanearum cortice prope Iglesias (Canepa)" (MOD. BAGLIETTO 1879:61, as *Hagenia tenella leptalea*).

N - Nuoro, on *Olea oleaster*. Leg. B. - Rio Aratu, on the twigs of *Prunus*. Leg. NP (TSB). - P.ta Palai. Leg. NP (TSB). - Arcu Correboi (2.5 Km NW of-), on *Quercus pubescens*. Leg. B. - Arcu Correboi. Leg. E (SZU). - Tonara (COLOSI 1917:465).

O - Paulilatino. (MAMELI 1920:163).

S - P.so La Variante, on *Pyrus*. Leg. E (SZU), M. - M. Limbara, on twigs of deciduous trees. Leg. E (HbWB). - Tempio Pausania, on *Pyrus communis* (MAMELI 1920:163).

A rather common lichen on twigs or branches of isolated trees and shrubs throughout Sardinia. It appears to be a southern species in Europe, with a maximum frequency in the Mediterranean region, and outliers as far north as south Scandinavia. We have observed it in many other localities.

17 P. stellaris (L.) Nyl.

N - Arcu Correboi (2.5 Km NW of-), on *Quercus pubescens*. Leg. W.

The samples cited by BAGLIETTO 1879:61 as *Hagenia stellaris* belong either to *P. aipolia* or to *P. biziana* (Specimens in MOD). In Sardinia

the species seems to be rare and is probably confined to the mountains.

18 *P. strigosa* Poelt et Buschardt

C - M. Arcuentu. Leg. E (HbWB, TSB), M.

N - Torre Argentina, epilithic. Leg. NP (GZU,TSB).

This is a submediterranean to Mediterranean species in Europe, with isolated outliers in central Europe (BUSCHARDT 1979: 312). It is chiefly epilithic in the northern part of its range, whilst it grows on a great variety of substrates in the southern Mediterranean (POELT 1974). In Sardinia it is apparently rare.

19 *P. tenella* (Scop.) DC.

C - Portixeddu. Leg. M, a somewhat deviating form. - Costa Verde, on *Juniperus macrocarpa*. Leg. B. - Rio Aratu, on the twigs of *Prunus*. Leg. NP (TSB).

N - Lanusei, on *Juglans*. Leg. E (TSB).

S - Tavolara. Leg. Brizzi (TSB). - P.so La Variante. Leg. E (SZU).

20 *P. tribacia* (Ach.) Nyl.

C - M. Sette Fratelli. Leg. WP. - M. Arcuentu. Leg. E (GZU).

The species is formally close to *Physcia dubia* and *Physcia dimidiata*, from which it may be distinguished by microscope (NADVORNIK 1947; FREY 1963) and by the general appearance, including the colour. In comparison with *Physcia dubia*, whose distribution reaches the Arctic, *Physcia tribacia* seems to be a rather southern species in Europe. A distribution map in central Europe is in WIRTH (1972:78). The citation of MAMELI 1920: 164, from a tree in Tempio Pausania is doubtful.

21 *P. wainioi* Raes.

N - Seui. Leg. M.- Arcu Correboi. Leg. E (GZU, TSB). - Rio Aratu. Leg. NP (GZU), W. - P.ta Paulinu, on acid rock. Leg. NP (TSB). -

Desulo, top of an isolated boulder. Leg. NP (TSB).

S - M. Limbara. Leg. M. - Tavolara. Leg. Brizzi (TSB). - Nuraghe Losa. Leg. E (GZU).

Considered by MOBERG (1977) as a modification of *Physcia caesia* from which it is distinguished by having persistently marginal, labriform soralia (see also BUSCHARDT 1979: 321); we think that this lichen is a distinct species. According to POELT (1969:51) its European distribution ranges from the Mediterranean area to south Scandinavia, with greater frequency in rather continental regions (distribution map in Central Europe: WIRTH 1972:160). It is also known from North America (THOMSON 1963:88), where it is rare, and Central Asia (POELT 1974:75).

111 *Physconia*

The genus *Physconia* in Europe has the highest diversity in the submediterranean and Mediterranean regions. The taxonomy of some groups still requires further study.

1 *P. distorta* (With.) Laund.

Syn.: *Physconia pulverulacea* Moberg, *Physconia pulverulenta* (Schreb.) Poelt

C - Ciri Foddi. Leg. NP (GZU,TSB). - Giara di Gesturi. Leg. W. - M. Sette Fratelli, on *Quercus suber*, 500 m. Leg. WP. - M. Arcuentu. Leg. E (GZU). - Iglesias, Domusnovas, M. Sette Fratelli (MOD. BAGLIETTO 1879:62). - Cervi. Leg. Tretiach (TSB).

N - M. Arbu. Leg. E (TSB), M. - Seui, on *Ulmus*. Leg. E (TSB), M. - Isili (COLOSI 1917:465). - Seui. Leg. Marcucci. (MOD. BAGLIETTO 1879:62). - P.ta Palai. Leg. Pertot (TSB).

S - Tempio Pausania, on *Ulmus*. Leg. E (TSB). - Altopiano di Campeda, on *Ulmus*. Leg. B. - P.so La Variante. Leg. E (SZU).

It is possible that *Physconia distorta* is not homogeneous; in the Mediterranean area some forms are similar to *Physconia servitii* but lack the typical hyaline hairs of that species.

2 *P. enteroxantha* (Nyl.) Poelt

Syn.: *Physcia enteroxanthella* (Harm.) Oliv.

C - Ciri Foddi. Leg. NP (GZU). - Arcu Genna Bogai, on *Quercus suber*. Leg. B. - Villacidro. Leg. WP. - Road Arbus-Buggerru. Leg. E (SZU). - M. Arcuentu. Leg. E (SZU).

N - M. Arcueri, on *Acer*. Leg. E (TSB). - Lanusei, on *Quercus pubescens*. Leg. E (TSB). - Rio Pardu, on subvertical acid rocks, with apothecia. Leg. E (GZU). - Arcu Correboi, 1130 m, on *Quercus pubescens*. Leg. E (GZU), B. - M. Ortobene. Leg. Pertot (TSB).

S - Aggius (2 Km NE from -), on *Quercus suber*. Leg. W. - P.so La Variante. Leg. E (SZU). - Nuraghe Loelle. Leg. Pertot (TSB).

This species is very close to *Physconia deterosa* from which it is primarily distinguished by the yellow colour of the medulla. In Europe it ranges from northern Scandinavia to the Mediterranean region. Its total distribution extends to Asia as far as the Himalayas and to North America.

3 *P. grisea* (Lam.) Poelt subsp. *grisea*

C - Giara di Gesturi, on *Quercus suber*. Leg. NP (GZU,TSB). - "Ad *Amygdalorum corticem* prope Cagliari sterilis" (MOD. BAGLIETTO 1879: 62 as *Hagenia pulverulenta pityrea*). - Road Arbus-Buggerru.

Leg. E (SZU).

N - Rio Pardu, with apothecia. Leg. E (GZU). - Esterzili. Leg. E (GZU), M.

S - SS. Trinita' di Saccargia, on *Ulmus*. Leg. E (TSB). - Tempio Pausania, on *Ulmus*. Leg. E (TSB).

This species has a wide distribution, and a correspondingly wide ecological tolerance. Its range extends from the southern edge of the Boreal zone to the Mediterranean zone. It occurs on bark, rock and even soil. The non-soresiose subspecies *algeriensis*, known from the southern Mediterranean region, and the phyllidiate, very nitrophytic subspecies *lilacina*, both of which should occur on the island, have not been found by us.

4 *P. perisidiosa* (Erichs.) Moberg

Syn.: *Physconia farrea* (Ach.) Poelt

C - Giara di Gesturi, on *Quercus suber*. Leg. W.

N - Desulo. Leg. NP (GZU). - Esterzili. Leg. E (GZU). - Rio Pardu. Leg. E (GZU).

This species ranges from Scandinavia to North Africa and is also present in Asia to the Himalayas. In central and southern Europe it is more frequent in the montane belt. It seems to be the most nitrophilous species in the genus. The well-known name *Physconia farrea*, with a very clear description, has been replaced by *Physconia perisidiosa* which is based on a very atypical type specimen.

5 *P. petraea* (Poelt) Vezda et Poelt

O - M. Arcuentu, on basaltic rock and on epilithic mosses. Leg. E (HbWB, GZU, TSB).

This taxon is close to *Physconia muscigena* s. str., from which it differs in the general shape of the thallus, the form of the adventive lobules, the thread-like rhizines, and some anatomical characters; also, in contrast to *Physconia muscigena*, it occurs directly on rock. Hitherto known only from a few stations in the Alps and Corsica (VEZDA, Lich. Sel. Exicc. 899).

6 *P. servitii* (Nadv.) Poelt

C - Giara di Gesturi. Leg. NP (GZU). - Arcu Genna Bogai, on *Quercus suber*. Leg. B. - Carbonia, 150 m. Leg. WP. - M. Sette Fratelli. Leg. WP. - Road Arbus-Buggerru. Leg. E (SZU).

N - Arcu Correboi, on *Quercus pubescens*. Leg. B.

O - Assolo (2 Km S of-), on *Quercus pubescens*. Leg. WP.

S - Altopiano di Campeda. Leg. B.

This is a typically Mediterranean species, characterized by the black

lower cortex and the hairs on the tips of the lobes. Ecologically, it resembles *Physconia venusta*.

7 *P. subpulverulenta* (Szat.) Poelt var. *atlantica* Poelt

C - Ciri Foddi, on *Quercus suber*. Leg. NP (GZU,TSB). - M. Sette Fratelli. Leg. WP.

N - Arcu Correboi (2.5 Km NW of-), on *Quercus pubescens*. Leg. B.

Var. *subpulverulenta* is a typically Mediterranean taxon which mostly occurs up to the montane vegetation belt, whereas var. *atlantica* is a poorly known taxon described from the isle of Madeira, which should be restudied on the basis of more abundant material. *Physconia subpulverulenta* is morphologically similar to *Physconia servitii* and *Physconia distorta* but lacks hairs on the upper surface and has a yellow medulla.

8 *P. venusta* (Ach.) Poelt

C - M. Sette Fratelli, on *Quercus suber*. Leg. WP. - Road Arbus-Buggerru, on *Quercus suber*. Leg. E (GZU). - Tupa Granella. Leg. Tretiach (TSB).

N - Rio Pardu. Leg. E (GZU). - P.ta Palai, on *Quercus pubescens*. Leg. NP (GZU,TSB), B. - Arcu Correboi (2.5 Km NW of-), on *Quercus pubescens*. Leg. B. - Arcu Correboi. Leg. E (SZU). - M. Arcueri, on *Quercus ilex*. Leg. E (TSB). - M. Arbo. Leg. E (SZU,TSB). - Tonara (COLOSI 1917:465). - M. Albo. Leg. Pertot (TSB). - M. Ortobene. Leg. Pertot (TSB).

O - M. Ferru, on *Quercus ilex*. Leg. B.

This species is confined to the Mediterranean region, where it is most common in the montane belt. It has also been reported from central Europe, but these records are due to confusion with old specimens of *Physconia distorta* with more or less lobulate apothecial margins.

112 *Phyisma*

1 *P. omphalarioides* (Anzi) Arnold

C - Decimomannu, ad vetustos castanearum truncos. (MOD, BAGLIETTO 1879: 117) - Carbonia, 150 m. Leg. WP (Dupl. in HbWB).

N - P.ta Palai. Leg. WP.

This is a Mediterranean species in Europe, which, surprisingly, also occurs along the coast of Norway (Nordland and Nord-Troendelag, see DEGELIUS 1955). Our collections have been identified by H. Schiman-Czeika.

113 Placidiopsis

by O. BREUSS

The genus includes species that are closely related to Catapyrenium but have 2 (- 4)-celled spores. Possibly the two genera should be united. The majority of the species have been collected only a few times. Some species described as belonging to this genus, or included in it as a result of new combinations belong to different genera.

1 *P. cinerascens* (Nyl.) O. Breuss

Syn.: Placidiopsis circinata Bagl.

C - "Super terram prope praedium Alcais prope Cagliari". Leg. Canepa. BAGLIETTO 1979: 112. (typus of Placidiopsis circinata in MOD, isotypus in W: H. Lojka: Lichenotheca Universalis no.96 sub Endocarpon circinatum).

The specimens distributed by Lojka correspond very well in the details of their anatomy to the type material of Endocarpon cinerascens Nyl. It is doubtful whether other rare species, described from southern Europe (*P. baumgartneri* Zahlbr., *P. dalmatica* Serv. etc.), really differ from *P. cinerascens*. This species is also cited by COLOSI 1917: 470 as Catapyrenium circinatum from Cagliari.

114 Placocarpus Trevis. em. O. Breuss

by O. BREUSS

The genus has been recently separated from Verrucaria (BREUSS 1985). It includes only one species, which starts its life-cycle as a parasite in the thalli of *Lecanora muralis*, later becoming autotrophic (see also ZEHETLEITNER 1978).

1 *P. schaererii* (Fr.) O. Breuss

C - M. Arcuentu. Leg. E (GZU).

N - Rio Madau. Leg. W.

The specimen from M. Arcuentu is a juvenile state in the thalli of the host. The species should be more common in limestone-areas of Sardinia. It grows in warm, xeric sites, and is widespread, with a rather scattered range, throughout the Mediterranean and submediterranean parts of southern Europe. On the occurrence of this species in southeastern Spain see CASARES & LLIMONA 1984:213.

115 Placolecis

1 *P. opaca* (Fr.) Hafellner

Syn.: *Lecidea opaca* Fr., *Astroplaca opaca* (Fr.) Bagl.

N - Iacco di Seui, on limestone. Leg. Marcucci. (MOD. BAGLIETTO 1879:95).

Placolecis opaca is a Mediterranean species, growing on limestone, with isolated outliers in Central Europe (Belgium, Westfalen). (SCHNEIDER 1979:67).

116 Placopyrenium O. Breuss gen. nov.

by O. BREUSS

Genus Verrucariacearum - Thallus epilithicus, crassus, diffracto-areolatus vel squamuloso-areolatus, effiguratus. Areolae ad basim distincte angustatae usque in stipite elongato protractae, superne teguminis epinecralis causa cinerascens, subtus nigrae, rhizohyphis nullis, stipitibus substrato adfixae. Thallus in toto (sub)paraplectenchymaticus cellulis angulosis vel rotundatis 5-10 μ m diam. compositus. Areolae basi lateriusque strato corticali carbonaceo tectae. Hyphae thallinae non amyloideae. Perithecia thallo innata, involucrello nullo. Asci clavati. Sporae in ascis biseriales, ellipsoideae aut ovoideo-oblongae, decolores, simplices non raro uniseptatae. Spermatia breve bacillaria.

Species typica est *Placopyrenium bucekii*.

Etymology: from Greek: *plax, plakos* = field, plate, in analogy to *Placocarpus*.

The new genus can be considered as derived from epilithic crustose Verrucariae. As in *Placocarpus*, the larger areolae or groups of areolae are attached to the substrate by stipes. Young areolae have a clearly constricted basis. A detailed discussion of the taxa belonging to the new genus will be given in a forthcoming paper. The following two, often misunderstood, species are from southern Europe (see also SERVIT 1936).

1 *P. bucekii* (J. Nadvornik et M. Servit) O. Breuss. comb. nov.

Basion.: *Dermatocarpon bucekii* ("Bucekii") Nadv. et Serv. in Beih.

Bot. Centralbl. 55 B, 1936: 267

C - Nora. Leg. NP (GZU,TSB). - M. Arcuentu, on hard silicates. Leg. E (GZU, HbWB,,TSB), M. - Is Paucaris. Leg. NP (TSB). - Rio Is Fonsuas. Leg. Tretiach (TSB).

N - Desulo. Leg. NP (GZU,TSB). - P.ta Palai, on acid rocks. Leg. NP (GZU,TSB). - M. Marmu, on Rock. Leg. NP (GZU,TSB)

S - Torralba. Leg. M.

This is a characteristic species, mostly on siliceous rocks, with clearly elongate, divided marginal lobes and an areolate central part of the thallus. The distribution is chiefly Mediterranean-submediterranean, with extensions to the Canary Islands westwards and to the Caucasus eastwards.

2 **P. trachyticum** (F. Hazslinsky) O. Breuss comb. nov.

Basion.: *Endopyrenium trachyticum* Haszl. in Verhandl. Verein f. Naturk. Pressburg 5, 1860-1861:7.

N - Esterzili, on limestone. Leg. E (GZU).

S - SS. Trinita' di Saccargia, on siliceous rock close to the church. Leg. E (GZU,TSB).

The thallus of this widespread but scattered and generally not common species consists of groups of areolae which become somewhat squamulose at the margins.

117 **Placynthium**

The genus *Placynthium* is very poorly studied in the Mediterranean part of Europe.

1 **P. nigrum** (Huds.) Gray

C - Cagliari (Promontorio S. Elia). Leg. Canepa (MOD, BAGLIETTO 1879: 117, as *Lecothecium coralloides*).

N - M. Arcueri, on limestone. Leg. E (TSB). - Arcu Correboi, on sandstone on a wall, with *Toninia kolax*. Leg. E (TSB).

2 **P. subradiatum** (Nyl.) Arnold cf.

N - M. Mannu. Leg. NP (GZU).

S - Tavolara. Leg. Brizzi (TSB).

3 **P. tremiacum** (Massal.) Jatta

N - M. Arcueri, on limestone. Leg. E (HbWB), det.H.Schiman-Czeika.

118 **Platismatia**

1 **P. glauca** (L.) Culb. et Culb.

Syn.: *Cetraria glauca* (L.) Ach.

C - "Prope Iglesias. Leg. P. Gennari" (BAGLIETTO 1879:55).

N - Bruncu Spina, on acid rock. Leg. NP (GZU,TSB). - P.ta Palai, on

rock. Leg. NP (TSB), B. - M. Ortobene, on rock. Leg. NP (TSB). -
M. Arbu. Leg. E. Pignatti (TSB). - Arcu Correboi, on acid rock.
Leg. E (GZU, TSB). - Tonara (COLOSI 1917:461).

S - M. Limbara, on granite. Leg. E (GZU, HbWB, SZU, TSB), M.

Some of the collections consist of very small, poorly developed thalli.
In Sardinia the species has a distribution and an ecology resembling
those of *Pseudevernia furfuracea*.

119 *Plectocarpon*

1 *P. lichenum* (Sommerf.) D.L. Hawksw.

Syn.: *Lichenomyces lichenum* (Sommerf.) R. Sant., *Celidium stictarum*
Tul.

C - "Ad apothecia *Stictae pulmonariae* in Monte Sette Fratelli
(Canepa)" BAGLIETTO 1879: 121, as *Celidium stictarum*.

120 *Pleospilis*

1 *P. sp.*

S - Torralba, on *Aspicilia* sp. together with a species of *Skyttea*.
Leg. M.

121 *Polychidium*

1 *P. muscicola* (Sw.) Gray

N - Arcu Correboi, on mosses over siliceous substrate. Leg. E (GZU,
TSB). - Rio Pardu, with *Leptochidium albociliatum*. Leg. E (GZU).

122 *Polycoccum*

1 *P. galligenum* Veřda

C - M. Sette Fratelli, on *Physcia tribacia*. Leg. WP.

This species was originally described on *Physcia dubia* in Czechoslovakia
(VEŘDA 1969) and is also known from Britain, on *Physcia dubia* and
Physcia caesia (HAWKSWORTH 1975).

2 *P. sp.*

S - Capo d' Orso. Leg. M.

The specimens were growing on *Rinodina* sp., intermixed with

Diploschistes euganeus. At present this lichenicolous fungus cannot be identified.

123 Polysporina

1 *P. lapponica* (Schaer.) Degel.

Syn.: *P. dubia* (H. Magn.) Vežda, *Sarcogyne dubia* H. Magn.; *Sarcogyne canasiacensis* (Hue) H. Magn.; *Acarospora silesiaca* H. Magn.

C - Giara di Gesturi. Leg. NP (GZU).

N - Arcu Correboi, on *Acarospora*. Leg. E (GZU).

S - M. Limbara, on *Acarospora* sp. Leg. E (GZU).

According to DEGELIUS (1986) *Polysporina lapponica* is the correct name for the lichen currently named *Polysporina dubia*. Here we follow DEGELIUS, but we might remark that the taxonomy and biology of this lichen are not yet clear. The apothecia of *Polysporina lapponica* are of *Polysporina simplex*-type, but the former is parasitic on *Acarospora* species. The complex, and the way of parasitism should be studied in the future in more detail. *Polysporina lapponica* seems to be not rare in southern and southern Central Europe.

2 *P. simplex* (Dav.) Vezda

Syn.: *Sarcogyne simplex* (Dav.) Nyl.

C - "Ad muros campestris inter Orri atque Sarocc (Canepa)". (BAGLIETTO 1879:105, as *Sarcogyne simplex*). - Below P.ta Serpeddi, on acid rock. Leg. NP (GZU, TSB). - Road Arbus-Buggerru, on phyllitic rock. Leg. E (HbWB, TSB).

N - M. Arcueri. Leg. M. - Desulo, on acid rock. Leg. NP (GZU, TSB). - Bruncu Spina, on pebbles. Leg. NP (TSB). - Su Lampu. Leg. W. - Rio Madau. Leg. W. - Seui. Leg. E (TSB), M. - Arcu Correboi. Leg. E (GZU), M. - Tonara (COLOSI 1917:469).

S - P.so La Variante, on granite. Leg. E (TSB). - P.ta Falcone, on schist. Leg. Pertot (TSB).

Polysporina simplex is a rather frequent lichen in Sardinia; because of its small size it has been probably overlooked in many other localities.

124 Porina

1 *P. aenea* (Wallr.) Zahlbr.

C - Portixeddu, on *Pinus*. Leg. E (GZU).

2 **P. chlorotica** (Ach.) Muell.Arg.

N - P.ta Palai, on acid rock, periodically submerged. Leg. NP (GZU,TSB). - M. Arbu. Leg. M.

3 **P. linearis** (Leight.) Zahlbr.

C - "Ad rupes calcareas sub parvum orbillarum forma inter alios lichenes vermiculata, Cagliari (Canepa)". (MOD. BAGLIETTO 1879:116 as *Sagedia persicina* var. *plumbea*).

4 **P. sp.**

N - M. Arbo, on siliceous rocks. Leg. M.

According to A. Vežda (in litt.), this specimen with reddish brown perithecia belongs to the *Porina rufula* aggregate; the taxonomy of this undescribed species has yet to be worked out.

125 **P o r p i d i a**

The genus *Porpidia* is not very well understood in the Mediterranean area, and is presently under revision, under the supervision of Prof. H. Hertel (Munich).

1 **P. crustulata** (Ach.) Hertel et Knoph

Syn.: *Huilia crustulata* (Ach.) Hertel

S - P.so La Variante, on pebbles. Leg. E (TSB).

Porpidia crustulata typically occurs on small siliceous pebbles at the soil surface.

2 **P. ~~macrocarpa~~** (DC.) Hertel et Schwab. s.l.

Syn.: *Huilia macrocarpa* (DC.) Hertel

C - Isola di S. Pietro. Leg. Feige, det. Feuerer.- Ciri Foddi, on hard acid rock. Leg. NP (GZU,TSB). - Below P.ta Serpeddi'. Leg. NP (GZU). - Road Arbus-Buggerru. Leg. E (HbWB,TSB). - Is Pauceris. Leg. NP (TSB). - S. Pantaleo. Leg. Tretiach (TSB).

S - P.so La Variante. Leg. E (GZU,TSB) - M. Russu, on granite. Leg. E (GZU).

The specimens from Ciri Foddi were growing together with *Porpidia platycarpoides*; although having a similar habitus, the two species were easily distinguishable from each other by the different reaction with KOH. At least some of the collections from Sardinia are distinctly different from typical *Porpidia macrocarpa*. The citation of *Lecidea platycarpa* var. *trullisata* from Cagliari by COLOSI 1917:469 is unlikely.

3 P. platycarpoides (Bagl.) Hertel comb. nova

Basion.: *Lecidea platycarpoides* BAGLIETTO Nuovo Giorn. Bot. Ital., 11:99 (1979).

Syn.: *Haplocarpon platycarpoides* (Bagl.) Hertel, Decheniana, 127: 62 (195); *Huilia platycarpoides* (Bagl.) Hertel, Herzogia, 3:374 (195).

Typus: Sardinia, inter Pula at Sarocc, ad rupes granitoideas. Leg. Canepa (MOD: holotypus and isotypus).

C - Ciri Foddi, on hard acid rock, with *Porpidia macrocarpa*. Leg. NP (GZU, TSB). - P.ta Serpeddi'. Leg. NP (GZU, TSB). - Giara di Gesturi. Leg. NP (GZU), W. - M. Sette Fratelli. Leg. WP. - "Ad rupes granitoideas Pula inter et Sarocc (Canepa)". (MOD, BAGLIETTO 1979:99, with original diagnosis). - S. Pantaleo. Leg. Tretiach (TSB). - Tupa Granella. Leg. Tretiach (TSB).

N - "In rupibus micaceis Seui". Leg. Marcucci (MOD. BAGLIETTO 1879:98-99). - Isili (COLOSI 1917:469).

O - M. Ferru. Leg. W.

S - Tavolara, on north facing siliceous rocks. Leg. Brizzi (TSB). - Palmadula. Leg. Pertot (TSB).

This species differs from *Porpidia macrocarpa* mainly by the different reaction with KOH, and also the somewhat thicker thallus. According to HERTEL (in litt.) the type material of *Porpidia platycarpoides* contains norstictic acid in high concentration.

P. speirea (Ach.) Krempelh.

Syn.: *Lecidea speirea* (Ach.) Ach.

C - "Ad rupes arenarias in valle Canonica supra Iglesias (Canepa)". (BAGLIETTO 1879: 98, as *Lecidea speirea*); we have not seen this specimen.

P. tuberculosa (Sm.) Hertel et Knoph

Syn.: *Lecidea tumida* Massal., *Lecidea solediza* Nyl., *Huilia tuberculosa* (Sm.) P. James

C - P.ta Serpeddi', on siliceous rock. Leg. NP (GZU, TSB).

This sorediate species has been much overlooked because it is often sterile.

126 P r o t o b l a s t e n i a

P. incrustans (DC.) Steiner

N - M. Albo, on limestone. Leg. NP (TSB).

2 *P. lusitanica* Raes.

N - Bidicolai, on the twigs of deciduous trees, 820-900 m. Leg. B. Hofbauer (HbWB).

Protoblastenia lusitanica is a western species of probably more or less oceanic localities. The species does not belong to *Protoblastenia* s. str.

3 *P. rupestris* (Scop.) Steiner

N - M. Albo, on limestone. Leg. NP (GZU, TSB). - M. Arcueri, on limestone, with *Arthonia lapidicola*, a rather atypical specimen. Leg. E (GZU, TSB).

4 *P. rupestris* (Scop.) Steiner var. *sarda* ad int.

N - M. Albo, on limestone. Leg. NP (GZU, TSB).

This taxon, part of the badly known *Protoblastenia rupestris* complex, has a nearly endolithic thallus, small apothecia (0.3-0.7 mm diam.) of a reddish orange colour, and spores measuring 14-17 x 6-6.5 μ m. The small, reddish apothecia recall those of *Protoblastenia cyclospora* (Hepp ex Koerb.) Poelt, which differs by having globose spores.

127 *Protoparmelia*

1 *P. badia* (Hoffm.) Hafellner

Syn.: *Lecanora badia* (Pers.) Ach.

S - M. Limbara. Leg. M. - S. Teresa di Gallura, on granite along the coast. Leg. M. - P.so La Variante. Leg. E (SZU), M.

According to SANTESSON 1984:141 this species is restricted to the cooler sites along the coast and in the mountains.

2 *P. montagnei* (E. Fries) Poelt et Nimis comb. nov. hoc loco

Basion.: *Parmelia montagnei* E. FRIES 1831:107 - *Lecanora montagnei* (E.Fries) Schaer.; SCHAERER 1850:62.

Typus: Gallia, Provence, Iles d' Hyeres. Leg. Montagne (UPS).

Syn.: *Placodium fuscopallens* Krempelh. (KREMPELHUBER ap. UNGER & KOTSCHY 1865: 161), typus: Cyprus, Crysothomo, Stn. Croce. Leg. Unger (M). - *Lecanora fuscopallens* (Krempelh.) Zahlbr. (ZAHLEBRUCKNER 1828:621) - *Lecanora psarophana* Nyl. (NYLANDER, Flora 55:429). - *Lecanora stenospora* Hue ap. MAHEU ET GILLET 1922:47; Typus: Minorque, Alayer, route a Port-Mahon. - Syn. veris (sec. descript.) *Lecanora rufofusca* MAHEU et GILLET 1922:43. - *Lecanora psarophana* var. *aquilina* CLAUZADE & ROUX 1985:427.

The type material of *Parmelia montagnei* is a single small specimen, about 1.2 cm in diam. Prothallus narrow, not always distinctly developed. Thallus areolate, marginal areoles often somewhat longer and broader than the inner ones, to 1.2 mm long. Inner areoles up to 1 mm in diam., but usually smaller, of irregular shape with brown, somewhat undulated surface, somewhat shining. Apothecia few, broadly attached, with blackish brown disc and more or less thick thalline margin.

Exciple at least in the upper part with a distinct cortex of anticlinal hyphae, 2-40 μm thick, densely interspersed by brownish granules of elongated form. Medulla completely filled by algae. Hypothecium conglutinate but lumina distinctly visible, the lower part interspersed with larger, isodiametric granules. Hymenium ca. 70 μm high, strongly conglutinate. Paraphyses comparatively thick and stiff. Asci of *Protoparmelia*-type with abundant ascial jelly, therefore hymenium and subhymenium J+ intensely blue. Spores 8, ellipsoidal to narrowly elongate with rounded ends, ca. 8.5-10.5 x 2-3 μm ; medulla KC- or KC+ slightly reddish (description of the type material on one hand section).

Protoparmelia montagnei is mostly a rather large lichen, somewhat variable in colour and form; it is often damaged by invertebrates and the thallus tends to regenerate in different ways. The authors see no real differences with the other taxa cited above as synonyms. The marginal areolae are variable in form and size, partly depending on the type of substrate. The type material of *Lecanora* (*Lecania*) *stenospora* is also identical; the spores are "pseudoseptate". Since *Protoparmelia montagnei* is common in Sardinia, it should be widespread also in Corsica; the authors of *Lecanora rufofusca* do not cite it from this island. As the description of *Lecanora rufofusca* fits well our species, we conclude that also this name should be considered as a synonym of *Protoparmelia montagnei*. Also the name *Lecanora nitens* has been used for *Protoparmelia montagnei*, but according to the descriptions this should be another lichen. It is possible that also *Lecanora zonata* Bagl. refers to *Protoparmelia montagnei*; Baglietto should have seen material of this species from Sardinia, but in his list he cites only *Lecanora zonata*. The lichens united here under the name *Protoparmelia montagnei* are morphologically very similar, but chemically different. Some analyses made by C. Leuckert (in litt.) suggest that the group should be studied on more abundant material. *Protoparmelia montagnei* is rather common on open siliceous rocks and boulders throughout the Mediterranean region. From Sardinia we have the following collections:

- C - Below P.ta Serpeddi'. Leg. NP (GZU, TSB). - P.ta Serpeddi'. Leg. NP (GZU). - Capo Pecora. Leg. E (HbWB, TSB) M. - Nora. Leg. NP (GZU). - Isola dei Cavoli. Leg. NP (TSB). - Isola di S. Antioco.

Leg. Brizzi (TSB).

N - Arcu Correboi. Leg. E (GZU), M.

S - S. Teresa di Gallura. Leg. E (TSB), M. - M. Russu. Leg. E (HWB, TSB). - Stintino, on phyllitic rock. Leg. B. - P.ta Falcone, on schist. Leg. NP (TSB).

3 *P. petraeoides* (Nyl. ex Bab. & Mitt. in Hook.) Hertel

Syn.: *Lecidea petraeoides* Nyl. ex Ch. Babingt. & Mitten in HOOKER, Flora Tasman., 2: 532, zab. CC, fig. D* (1860). - *Lecidea subtenebrosa* Nyl., *Lecidea aspidula* Krempelh., *Lecidea myoplaca* Zahlbr.

S - P.so La Variante, on granite. Leg. E (GZU). - M. Limbara, on granite. Leg. E (GZU).

This species was hitherto only known from southeast Australia, Tasmania and New Zealand, where it is locally common. Our material has been identified by HERTEL (in litt.) and contains norstictic acid.

4 *P. sp.*

S - P.so La Variante, on *Quercus suber*. Leg. E (GZU).

This lichen gives the impression to be a typical corticolous taxon, not an exceptionally epiphytic thallus of a saxicolous species.

128 *P s e u d e p h e b e*

1 *P. minuscula* (Nyl. ex Arn.) Brodo et Hawksw.

Syn.: *Alectoria minuscula* (Nyl.) Degel.; *Parmelia minuscula* (Nyl.) Nyl.

N - Bruncu Spina, on quartz in wind-swept ridge. Leg. NP (GZU, TSB).

Pseudephebe minuscula has an ecology and distribution that are rather similar to those of *Pseudephebe pubescens*; perhaps it is even more restricted to extreme habitats. According to BRODO & HAWKSWORTH 1977:41, it is a circumpolar, arctic-alpine species. In Sardinia it is restricted to the highest peaks of the Gennargentu-Massive.

2 *P. pubescens* (L.) Choisy

Syn.: *Alectoria pubescens* (L.) R. Howe; *Parmelia pubescens* (L.) Choisy

N - Bruncu Spina, with the previous species. Leg. NP (GZU, TSB). - Gennargentu. Leg. Gennari (MOD. BAGLIETTO 1879:65 as *Parmelia lanata*).

An arctic-alpine species, with a very wide circumboreal distribution in both hemispheres. The southernmost locality in Italy is in Sicily (Madonie Mts., TSB).

129 *Pseudevernia*

1 *P. furfuracea* (L.) Zopf var. *furfuracea*

C - Below P.ta Serpeddi', on rock. Leg. NP (GZU). - "Ad arborum corticem in sylvis montanis Capoterra (Gennari)" (BAGLIETTO 1879:59, as *Evernia furfuracea*). - M. Maxias, epiphytic. Leg. Tretiach (TSB).

N - P.ta Palai, on *Quercus pubescens* and rock. Leg. NP (GZU,TSB), B. - Arcu Correboi, on rock. Leg. E (GZU,SZU,TSB), B. - Desulo. Leg. NP (GZU). - M. Arbo. Leg. E (HbWB).

S - M. Limbara, on *Pinus*. Leg. E (GZU,HbWB,SZU,TSB), M. - P.so La Variante. Leg. E (GZU).

In Sardinia this species is restricted to the mountains, and often occurs with *Platismatia glauca*. See also note on the following taxon.

2 *P. furfuracea* var. *ceratea* (Ach.) D.L. Hawksw.

N - M. Arcueri. Leg. M. - Bruncu Spina, on acid rock. Leg. NP (TSB). - Arcu Correboi. Leg. E (SZU).

Not all of the specimens of *Pseudevernia furfuracea* have been tested with C, so that var. *ceratea* might also occur in collections treated under var. *furfuracea*.

130 *Psilolechia*

1 *P. lucida* (Ach.) Choisy

Syn.: *Lecidea lucida* (Ach.) Ach.

O - M. Ferru, on *Quercus ilex*, cum apothecia Leg. B. - Busachi, on siliceous rocks. (MAMELI 1920:169, as *Biatora lucida*).

The species has been probably overlooked, since it very often occurs in the sterile state. A recent revision of the genus has been published by COPPINS & PURVIS (1987).

131 *Psora*

1 *P. albilabra* (Duf. in Fr.) Koerb. subsp. *albilabra*

N - Grotta su Marmuri, 900 m., on moss over limestone. Leg. B. - M. Arcueri, in fissures of limestone rock. Leg. E (TSB).

This species ranges from the steppes of Central Asia to the Mediterranean region (including North Africa; SCHNEIDER 1979:100),

where it is generally not common, with isolated outposts in the most continental parts of central Norway.

2 P. albilabra subsp. **deceptoria** (Nyl.) Clauz. et Roux

N - Supramonte di Oliena. Leg. W.

Psora deceptoria was considered as a synonym of *Psora albilabra* by SCHNEIDER 1969, whereas CLAUZADE & ROUX 1985: 645 treat it as a subspecies of *Psora albilabra* s.lat. We have no clear ideas about this problem, and we prefer to follow the arrangement of the latter authors just to emphasize an unresolved problem.

3 P. decipiens (Hedw.) Hoffm.

C - Buggerru, on soil. Leg. E (TSB). - Isola di S. Pietro. Leg. Feige.

N - M. Albo, on calcareous soil. Leg. NP (TSB). - Arcu Correboi, on soil. Leg. B. - M. Arcueri, on calcareous soil. Leg. E (GZU, TSB).

O - Capo Mannu, on soil. Leg. B, Feige.

S - Anghelu Ruju. Leg. W. - ibid. Leg. Pertot (TSB).

Psora decipiens is one of the most common lichens on calcareous soil from the Arctic to the Mediterranean zone. The relationship of this species with the very similar *Psora crenata* (Th.Tayl.) Reinke is not clear; according to SCHNEIDER (1979:104) there are only very slight morphological and no chemical differences between the two species. We are inclined to consider them as synonyms.

4 P. gresimonis B. de Lesd.

S - Supramonte di Oliena, on limestone. Leg. W.

In Italy the species is known also from Liguria (type specimen) and Calabria (TSB). For its distribution in southern France, see CLAUZADE 1969:107.

5 P. testacea Hoffm.

Syn.: *Chrysopsora testacea* (Hoffm.) Choisy

N - Arcu Correboi, in fissures of limestone rock. Leg. B.

132 P s o r o m a

1 P. hypnorum (Vahl) S.Gray

N - P.ta Paulinu, on epilithic mosses. Leg. NP (TSB).

A specimen without locality from the herbarium Moris is in MOD, cited also by BAGLIETTO 1879:68 as *Pannaria hypnorum*). The species is circumboreal-montane, extending into the Arctic circle and along major mountain chains.

133 Psorotichia

- 1 **P. lignyota** (Wahlenb.) Forss.
C - M. Arcuentu. Leg. E (GZU), identification not certain.
- 2 **P. riparia** Arn.
C - Below P.ta Serpeddi'. Leg. NP (GZU).

134 Pyrenopsis

- 1 **P. microstoma** (Born. et Nyl.) Forss. cf.
S - Capo d' Orso, on granite. Leg. E (GZU).
- 2 **P. rhodosticta** (Tayl.) Muell. Arg.
Syn.: *Pyrenopsis sanguinea* Anzi
N - Torre Argentina. Leg. NP (GZU).

135 Pyrenula

- 1 **P. chlorospila** (Nyl.) Arn.
Syn.: *Pyrenula nitidella* var. *chlorospila* (Nyl.) Degel.
C - Capoterra, on Ceratonia. Leg. Canepa (MOD, BAGLIETTO 1879: 113,
as *Pyrenula nitida* b) *nitidella*).
This long neglected species seems to be confined to the Mediterranean region.

136 Pyrrhospora

- 1 **P. quercea** (Dicks.) Koerb.
Syn.: *Lecidea quercea* (Dicks.) Ach.; *Protoblastenia quercea* ("Ach.") Clauzade.
C - Giara di Gesturi, on *Quercus suber*. Leg. NP (TSB). - "Super *Ericam arboream* ad turrim Cala d'Ostia prope Pula (Canepa)" (BAGLIETTO 1879:105 as *Biatora quercea*).
S - Stintino, on *Juniperus*. Leg. B. - P.ta Falcone. Leg. Pertot (TSB).
This species has a Mediterranean-atlantic-subatlantic distribution in Europe. In Italy there are recent collections from the Tyrrhenian coast (Liguria, Tuscany, Latium, Campania) and from the Tremiti Islands (TSB).

137 *R a m a l i n a*

The genus *Ramalina* in the Mediterranean region is still poorly known. Some complexes are certainly worthy of detailed studies. Some of our collections, above all those referable to *Ramalina fastigiata* s. latiss., remain unidentified, and are not reported below.

1 *R. arabum* (Ach.) Mey. et Flot.

S - P.ta Falcone, on acid rock in wind-swept ridge above the coastline. Leg. NP. (GZU, TSB).

A very characteristic but rare species growing on siliceous rocks close to the coast. The species has a broad world distribution, being known from Algeria, St. Helena, Reunion Islands, Nova Caledonia and the Cabrera island (ILIMONA 1976:132-133). In Italy it is known also from the Egadi islands (a specimen in MOD).

2 *R. breviuscula* Nyl.

Syn.: *Ramalina mediterranea* H. Magn. (?).

C - Monastir, ad rupes, 1835, sub *Ramalina monastiri mihi*. Leg. De Notariis. (MOD). - Montevecchio, on basaltic rocks. Leg. Marcucci. - Isola Serpentara 18.8.1875. Leg. Gestro (MOD). - Isola dei Cavoli. Leg. NP. (TSB, GZU). - Nora. Leg. NP. (GZU).

S - P.ta Falcone, on rock. Leg. NP (TSB). - ibid. Leg. Pertot (TSB). - Stintino, on phyllitic rock. Leg. B. - Capo d' Orso, on granite. Leg. E (GZU, TSB). - Palau, on granite. Leg. F. Ceni (TSB). - M. Russu, on granite near the coast. Leg. E (TSB). - Alghero. Leg. Pertot (TSB).

? - Sine localitate in Herb. Moris, sub *Ramalina fastigiata*. (MOD).

Included here are most of the citations by BAGLIETTO 1879: 57, as *Ramalina fastigiata* b) *pumila* Moris et De Not. This is a common species on rocky siliceous coasts throughout Sardinia.

3 *R. calicaris* (L.) Fr.

C - Monte Santo di Pula, epiphytic. Leg. Canepa. (MOD). - Gonnos Fernadiga. Leg. Marcucci. (MOD, BAGLIETTO 1879:56). - Domus Novas (woods above -) 1.1867. Leg. Canepa. (MOD). - Iglesias. Leg. De Notaris (BAGLIETTO 1879:56) - Is Pauceris, on *Quercus suber*. Leg. NP. (TSB). - Arcu Genna Bogai, on *Quercus suber*. Leg. B. - M. Sette Fratelli (BAGLIETTO 1879: 56). - Rio Is Faneuas. leg. Tretiach (TSB). - S. Antiogus. Leg. Tretiach (TSB).

N - Orri, on *Quercus* and *Phillyrea*. 1867. Leg. Canepa (MOD, Herb. Critt. Ital. II: 15. In MOD two envelopes, one contains *R. farinacea*). - Flumini Bina, on *Quercus*. Leg. Canepa. (MOD). - P.ta

Palai, on Quercus and Acer. Leg. NP (TSB), B. - M. Arbo, Leg. E (HbWB, SZU, TSB), M. - Tonara (COLOSI 1917:460). - M. Ortobene. Leg. Pertot (TSB).

O - M. Ferru, on Quercus ilex. Leg. B.

S - P.so La Variante, on Quercus suber. Leg. E (HbWB, TSB). - Budduso' (COLOSI 1917: 460).

Ramalina calicaris is often mistaken for narrow-lobed forms of *Ramalina fraxinea* from which it differs in having straight spores. The ecology is also rather different, since *Ramalina calicaris*, at least in the Mediterranean region, is most frequent in moist montane woods. In Italy it is rather frequent from the central Apennines to Sicily (Madonie Mts.).

4 *R. canariensis* Steiner

C - Decimomannu, on Opuntia, 4.1869. Leg. Canepa. (MOD). - Cagliari, surroundings. Leg. Canepa. (MOD). - Giara di Gesturi, on Quercus suber. Leg. NP. (GZU, TSB). - Arcu Genna Bogai. Leg. B.

N - Flumini Bina. Leg. Canepa. (MOD).

S - P.ta Falcone, on Juniperus. Leg. NP. (GZU, TSB), W. - ibid. Leg. Pertot (TSB). - Palmadula. Leg. Pertot (TSB). - Lago di Baratz. Leg. Pertot (TSB). - Stintino, on Juniperus. Leg. B. - Capo Orso, on Quercus ilex. Leg. E (TSB).

The three specimens in MOD were as *Ramalina pollinaria* var. *elatior* Ach. This species is widespread from the western Mediterranean region to Macaronesia. In Italy it was frequent along the Tyrrhenian coasts of the Peninsula and of Sicily, and still persists in the few areas free from excessive urbanization; it is also known from the Tremiti Islands (NIMIS, 1985). It is most frequent on the branches of shrubs and small trees (*Pinus*, *Juniperus*, *Cistus* etc.) in litoral maquis vegetation.

5 *R. capitata* (Ach.) Nyl. v. *capitata*

N - Arcu Correboi. Leg. E (GZU, TSB).

S - Nuraghe S. Antine, on acid rock. Leg. E (TSB).

The specimens have only well-developed capitate soralia. COLOSI 1917: 461 describes a new variety of *Ramalina capitata* with the name of var. *sardoa*: we have not seen the type, but from the description we suspect that it could be identical with "*Ramalina digitellata* Nyl." See also the note on *Ramalina polymorpha*.

6 *R. capitata* "v. *strepsilis* (Ach.)"

Syn.: *Ramalina strepsilis* (Ach.) Zahlbr.

N - Desulo. Leg. NP (GZU, TSB). - P.ta Palai. Leg. Pertot (TSB).

S - Torralba. Leg. E (GZU, TSB).

The specimens have labriform soralia on the peripheral branches, capitate soralia on the inner branches. See note on *Ramalina polymorpha*.

7 *R. clementeana* Llimona et Werner

C - Porto Scuso, on granite. (MAMELI 1920:162, as *Ramalina cribrosa* D. Nrs.) we have not seen the specimen.

S - P.ta Falcone, on weakly inclined rock (schist). Leg. NP. (GZU,TSB). - ibid. Leg. Pertot (TSB). - Isola di Caprera. Leg. Gestro. (BAGLIETTO 1879: 58, as *Ramalina cribrosa fastigiata*. This specimen is not in MOD).

? - Two specimens in MOD, without locality (ex Herb. Moris), as *R. cribrosa* var. *fastigiata* (see BAGLIETTO 1879: 58). Another specimen in RO "ex Sardinia" with a note by H. MAGNUSSON: "*R. sardoa* sp. nov., holotypus").

This species was recently described from southeastern Spain. It differs from *R. pusilla* for having larger spores, rounded or elliptical pseudocyphellae, and grows on siliceous rock. The three specimens in MOD correspond fairly well to the original description of *Ramalina clementeana*. They are most probably those cited by MAMELI 1920:162; one was collected by Gestro on Caprera, and the others are from the herb. Moris (Southern Sardinia); these specimens were sent to De Notaris, who used them to describe a new variety of a new species, *R. cribrosa* var. *fastigiata* (DE NOTARIS 1846). This variety is identical to *R. clementeana* Llimona et Wern. KROG & ØSTHAGEN 1980: 288 and KROG (in litt.) consider *Ramalina clementeana* as a saxicolous morphotype of *Ramalina pusilla*, whereas CLAUZADE & ROUX 1985: 656 treat it as a distinct species; we are unable to come to a decision. For the distribution of this lichen in southeastern Spain see EGEA & LLIMONA (1983: fig. 56).

8 *R. cribrosa* De Not.

C - Montevecchio, on rock. Leg. Marcucci (MOD).

S - Isola Maddalena. Leg. Vaccari. (MOD). - S. Teresa di Gallura, on granite along the coast. Leg. E (GZU,TSB). - Caprera (RO - Holotype).

? - sine localitate, ex Herb. Moris (MOD).

The specimens of S. Teresa have been identified by H. Krog. They are dark green, with clearly fistulose laciniae, and agree morphologically and chemically with the type of *Ramalina cribrosa* (RO); they contain protocetraric acid (KROG, in litt.). It is possible that previous reports of *Ramalina siliquosa* or *Ramalina scopulorum* from the Mediterranean region actually refer to *Ramalina cribrosa*.

9 R. farinacea (L.) Ach. var. **farinacea**

C - Domus Novas (woods above -). 1.1867. Leg. Canepa. (MOD). - Is Pauceris, epiphytic. Leg. NP. (GZU). - Arcu Genna Bogai, on Quercus suber. Leg. B. - M. Maxias. Leg. Tretiach (TSB). - S. Pantaleo. Leg. Tretiach (TSB).

N - P.ta Palai, on Quercus pubescens. Leg. NP. (TSB). - Arcu Correboi. Leg. E (GZU,SZU). - M. Arbo. Leg. E (HbWB,SZU). - Tonara (COLOSI 1917:460) - Isili (COLOSI 1917:460). - M. Albo, on Quercus ilex. Leg. Pertot (TSB). - Foresta Montes. Leg. Pertot (TSB).

O - M. Ferru, on Quercus ilex. Leg. B.

S - P.so La Variante, on Quercus suber. Leg. E (GZU,SZU,TSB).

Ramalina farinacea is a chemically variable species (KROG & JAMES 1977); here we include specimens of the protocetraric acid strain, which is the most common in Europe (CULBERSON 1966), and the one that more extends towards the east. In Sardinia the species is rather common, with a maximum frequency in stands of *Quercus pubescens*.

10 R. farinacea var. **phalerata** Ach.

N - S'Arcu de Tascussi. Leg. NP (GZU). - Badde Orca. Leg. Pertot (TSB).

We wonder whether this taxon should not be lowered to the rank of a forma.

11 R. farinacea var. **reagens** B. De Lesd.

C - Is Pauceris, on Quercus suber. Leg. NP. (TSB).

N - M. Arcueri. Leg. E (GZU).

This is a chemical race of the *Ramalina farinacea* group, characterized by the presence of norstictic and salazinic acids. According to CULBERSON (1966:818), this lichen has a broader range in Europe than *Ramalina subfarinacea*. We wonder whether it really deserves to be treated at varietal rank; see also KROG & JAMES 1977:30-31.

12 R. fastigiata Pers.

C - Giara di Gesturi, on Quercus suber. Leg. NP. (TSB). - Arcu Genna Bogai, on Quercus suber. Leg. B. - Rio Is Fonsuas. Leg. Tretiach (TSB). - Tupa Granella. Leg. Tretiach (TSB).

N - Orri, epiphytic. (MOD). - Nuraghe Mereu, on *Acer monspessulanum*. Leg. E. Pignatti 25/5/82. (TSB). - Foresta Montes, 1300 m, on *Fraxinus*. Leg. E. Pignatti (TSB). - Rio Aratu, on *Pyrus*. Leg. NP. (TSB). - P.ta Palai, on *Acer*. Leg. NP (TSB) - *ibid.*, on *Quercus pubescens*. Leg. B. - S' Arcu de Tascussi, on *Alnus*. Leg. NP. (TSB). - M. Arcueri, on *Quercus ilex*. Leg. E (TSB),M; on *Ulmus*. Leg. E (HbWB). - M. Arbo. Leg. E (HbWB,TSB). - Tonara (COLOSI 1917:460) - Isili (COLOSI 1917:460). - M. Ortobene. Leg. Pertot

- (TSB). - M. Albo. Leg. Pertot (TSB). - Badde Orca. Leg. Pertot (TSB).
 O - M. Ferru, on *Quercus ilex*. Leg. B. - Cuglieri (COLOSI 1917: 460).
 S - P. so La Variante, on *Quercus suber*. Leg. E (HbWB, GZU, SZU, TSB).
 - Aggius, on *Quercus suber*. Leg. W. - Nuraghe Loelle, on *Quercus suber*. Leg. Pertot (TSB).

A common and very variable species on isolated trees throughout Sardinia. In the Mediterranean region it is very polymorphic both morphologically and chemically.

13 *R. fraxinea* (L.) Ach.

- N - Rio Aratu, on *Castanea*. Leg. NP. (TSB). - P.ta Palai, on *Quercus*. Leg. NP. (TSB). - M. Arcueri, on *Acer*. Leg. E (GZU, TSB).
 - Nuraghe Mereu, 700 m, on *Acer* (var. *calicariformis* Nyl.). Leg. E. Pignatti. (TSB). - Orgosolo, on *Fraxinus*. Leg. E. Pignatti. (TSB). - Arcu Correboi (2.5 Km NW of-) on *Quercus pubescens*. Leg. B. - Arcu Correboi. Leg. E (SZU). - Isili (COLOSI 1917: 460).
 S - Budduso' (COLOSI 1917:460).

A rather common species on isolated trees, less frequent in the lowlands.

14 *R. lacera* (With.) Laund.

Syn.: *Ramalina evernioides* auct., non Nyl.; *Ramalina duriae* (De Not.) Bagl.

- C - Assemini, on *Opuntia*. 1.1859. Leg. Gennari. (MOD, BAGLIETTO 1879:58). - Montevecchio, on basaltic rocks. Leg. Marcucci. (MOD).
 - Arcu Genna Bogai, on *Quercus suber*. Leg. B. - Giara di Gesturi, on *Quercus suber*. Leg. NP (GZU). - Capoterra (COLOSI 1917:460).
 S - Stintino, on *Juniperus* and acid rock. Leg. B. - Palmadula epiphytic. Leg. Pertot (TSB).

This is a Mediterranean-atlantic species, rather rare in the lowlands of Mediterranean Italy, most frequent along the western side of the peninsula, from Liguria to south Latium. Its European distribution extends northwards to Scotland and south Scandinavia (KROG & JAMES, 1977: 30). In Italy it is often associated with *Ramalina canariensis* when epiphytic.

15 *R. pollinaria* (Westr.) Ach.

- N - Desulo, on rock. Leg. NP. (TSB).

Ramalina pollinaria is the only representative of the genus in Europe that can also grow on calcareous rocks. In southern Europe it has been often mistaken for other species, above all *Ramalina lacera* and *Ramalina requienii*.

16 R. polymorpha (Ach.) Ach. var. polymorpha

C - M. Sette Fratelli, on granite. Leg. WP.- P.ta Serpeddi', on rock. Leg. NP. (GZU, TSB).

N - Arcu Correboi. Leg. B, E (TSB).- Bidicolai. Leg. B. - Lago Alto di Flumendosa, 805-820 m, on granite. Leg. B.- Desulo, on acid rock. Leg. NP (GZU,TSB). - Bruncu Spina, on acid rock in wind-swept ridge. Leg. NP (TSB).

O - M. Ferru, on rock. Leg. B.

S - M. Limbara, on granite. Leg. E (HbWB,GZU,TSB). - P.so La Variante. Leg. M.

The *Ramalina polymorpha* group is extremely variable. As shown by KROG & JAMES 1977: 36-38, there is a continuous variation from forms with capitate soralia ("*Ramalina capitata* (Ach.) Nyl. s. str.") to forms with strongly convex labriform soralia ("*R. protecta* H. Magn."), other specimens have labriform soralia at the top of the peripheral branches, capitate soralia on the inner branches ("*R. strepsilis* (Ach.) Zahlbr."); finally, the laciniae may be finely divided into small branches, with very small terminal soralia ("*R. digitellata* Nyl."). *Ramalina polymorpha* s. str. has granular, corticate "soredia" often originating from pseudocyphellae, which seem to differ from the normal soredia of the other taxa of the complex. Most Spanish authors consider *R. capitata*, *R. digitellata* and *R. protecta* as distinct species (see EGEA & LLIMONA 1981). We can confirm the observations of KROG & JAMES 1977, having also observed a continuous transition of characters among the specimens of our collections; however, we have not found any transition between *Ramalina polymorpha* s.str. and lichens belonging to the other taxa of the complex. According to P. James (in litt.) *R. capitata* should be recognized as a distinct species, which we do. However, we wonder whether the other truly sorediate taxa discussed above should not be treated under *R. capitata* and not under *R. polymorpha*, as we do here partly following CLAUZADE ROUX 1985.

17 R. polymorpha "v. digitellata (Nyl.)"

Syn.: *Ramalina digitellata* Nyl.

C - Below P.ta Serpeddi'. Leg. NP. (GZU, TSB).

N - Altopiano di Campeda, on basaltic lava. Leg. B.- Nuraghe Mereu, 700 m, on rock. Leg. E. Pignatti. (TSB). - Arcu Correboi. leg. E (TSB).

Ramalina digitellata Nyl. is considered by CLAUZADE ROUX 1985:663 as a synonym of *Ramalina polymorpha* subsp. *polymorpha* var. *implecta* (Ach.) Ach; however, according to P. James (in litt.), the type of var. *implecta* belongs to *Ramalina polymorpha* s. str.. Our specimens correspond well to the original description of *Ramalina digitellata*

Nyl., but some of those from P.ta Serpeddi' and Arcu Correboi show a distinct transition to 'R.strepsilis', which is placed by CLAUZADE & ROUX 1985:663 in the subsp. capitata. Since we did not see the type of R. digitellata we refrain from any new combinations although we have the impression that this taxon would be better treated under Ramalina capitata.

18 R. polymorpha v. protecta (H. Magn.) Clauz. et Roux

Syn.: Ramalina protecta H. Magn.

C - P.ta Serpeddi'. Leg. NP. (GZU, TSB).

A specimen with markedly convex, labriform soralia. See note on Ramalina polymorpha s.str..

19 R. pusilla Le Prev.

? - Ex Sardinia (RO).

Ramalina pusilla is a widespread lichen in the Mediterranean region, extending westwards to the Azores and the Canary Islands (KROG & ØSTHAGEN 1980: 288). In Italy it is known from several stations along the western side of the Peninsula, from Tuscany to Calabria, mostly below 300 m (several specimens in TSB). See also note on Ramalina clementeana.

20 R. requienii (De Not.) Jatta

C - Sulcis, without locality. Leg. Gennari. (MOD, BAGLIETTO 1879: 57). - M. Arcuentu, on acid rock. Leg. E (TSB). - Isola di S. Antioco. Leg. G. Brizzi (TSB).

S - P.ta Falcone, on Gneiss. Leg. Buschbom (Herb. Buschbom). - ibid. Leg. Pertot (TSB). - Capo d' Orso, on granite. Leg. E (GZU,TSB).

Ramalina requienii is characterized by the abraded isidioid outgrowths on the margins and the surface of the lobes. The margins have often an eroded appearance, the exposed medulla simulating soralia. There is a further record in COLOSI 1917: 460 from Budduso'; since the specimen was collected on Quercus suber and Ramalina requienii is normally epilithic, the identification of COLOSI is not certain. Ramalina requienii has been collected several times in southeastern Spain (EGEA & LLIMONA 1983: 57. In Italy it is known from Latium (TSB). Outside the Mediterranean region, the species is known from the Canary Islands and the Azores (KROG & ØSTHAGEN 1980:289). One of our specimens has been revised by H. Krog, and contains divaricatic acid (KROG, in litt.).

21 R. roesleri (Hochst. ex Schaer.) Hue

O - M. Ferru. Leg. B.

This is a rare species of very humid sites which in southern Europe is normally found in the upper montane vegetation belt. In northern Europe *Ramalina roesleri* has a north-eastern type of distribution that somewhat contrasts with its high moisture requirements it is absent from the British Isles, Denmark and Norway, whereas it occurs in Sweden and Finland. (KROG & JAMES 197:39).

22 *R. rosacea* (Schaer. ex Massal.) Hepp

Syn.: *Ramalina bourgeana* auct.

C - Isola dei Cavoli, on acid rock. Leg. NP. (GZU,TSB). - Isola Serpentara. (BAGLIETTO 1879:58, sub *Ramalina bourgeana* b) morisiana Bagl., the typus of the variety was not found in MOD).

This species was originally described from Corsica (MASSALONGO 1855). It is very close to *R. bourgeana* Mont. ex Nyl., described from the Canary Islands, from which it differs in having a much smoother, slightly thinner laciniae and marginal, mainly apical apothecia; in the case that *R. rosacea* and *R. bourgeana* would be considered as synonyms the former name would have the priority (KROG & ØSTHAGEN, 1980: 265). In checking the material of *R. rosacea* in several Italian Herbaria (mostly identified as *R. bourgeana*) one of the authors (Nimis) found variable colour reactions suggesting that the species might encompass at least two different chemical strains, one with norstictic acid, one without it. For the distribution of this lichen in southeastern Spain see EGEA & LLIMONA 1983: 55, as *Ramalina bourgeana*.

23 *R. subfarinacea* (Nyl. ex Cromb.) Nyl.

C - S. Barbara, on rock. Leg. Gennari. (MOD). - Capo Cabonara. Leg. Gennari. (MOD). - Gonnosfanadiga. Leg. Gennari. (MOD). - dintori di Cagliari, sulle rupi. (MOD). - Gennamari (Iglesias) on rock. Leg. Gennari (MOD). - Below P.ta Serpeddi', on rock. Leg. NP (GZU). - M. Maxias. Leg. Tretiach (TSB).

N - P.ta Palai, on rock. Leg. NP (GZU). - Flumini Bina, ad Rupes. Leg. Canepa (MOD). - Arcu Correboi, on gneiss. Leg. B, E (TSB). - M. Ortobene, on rock. Leg. NP (GZU,TSB).

O - M. Ferru, on rock. Leg. B.

S - P.so La Variante, on granite. Leg.E (SZU), M.

Ramalina subfarinacea in the sense of CULBERSON (1966) is characterized by the presence of norstictic acid only. KROG & JAMES (1977) have a different concept of the species, which contains several chemical races as in *Ramalina farinacea*, from which it differs ecologically and morphologically; here we follow the species concept of KROG & JAMES op.cit.. This species is distinctly western in Europe, and almost always occurs on rocks near the coasts. Its distribution extends to the

Arctic zone (KROG & JAMES 1977:41). Among the species of the *Ramalina farinacea*-complex, this is one of the most common in Sardinia, and reaches a maximum frequency in the montane belt, sometimes some distance from the coast.

24 *R. subgeniculata* Nyl.

C - M. Santo di Pula, epiphytic. Leg. Gennari (MOD). - Flumini Bina, on *Quercus*. Leg. Canepa (MOD).

N - P.ta Palai, epiphytic. Leg. NP (GZU). - M. Arbo, on *Quercus suber*. Leg. E (TSB).

S - P.so La Variante, on *Quercus suber*. Leg. M.

This characteristic species is known from the Canary Islands, southern Spain, the Balearic Islands and southern France (KROG & ØSTHAGEN, 1980: 290). In Italy *Ramalina subgeniculata* has been also collected along the Tyrrhenian coasts of the Peninsula (Tuscany, Latium) and in the Isle of Pantelleria (NIMIS & TRETACH, in prep.), always growing on twigs of shrubs in littoral maquis vegetation. All our specimens contain divaricatic acid. *Ramalina subgeniculata* in European collections has been often named *Ramalina panizzei*. The latter species was originally described from Liguria (DE NOTARIS 1846:211-212). The exact circumscription of the species was not very clear, since the type material was not available. The type of *Ramalina panizzei* has been found by us in MOD (NIMIS & TRETACH, in prep.) and proved to be morphologically similar but chemically very different to *Ramalina subgeniculata* Nyl., so that the two species cannot be considered as synonyms.

25 *R. thrausta* (Ach.) Nyl.

N - P.ta Palai. Leg. Pertot (TSB).

Ramalina thrausta is a rare species in Sardinia; it is probably restricted to closed forests with *Ilex aquifolium* and *Taxus baccata* with high frequency of fog.

26 *R. tingitana* Salzm.

C - Between Pula and Sarocc. Leg. Canepa. (MOD). - Isola del Toro. Leg. Martelli, 3.5.1894. (NA, Det. H. Magnusson)

N - Nuraghe Mereu, 700 m, on rock. Leg. E. Pignatti (TSB).

S - S. Teresa di Gallura, on granite along the coast. Leg. E (TSB, GZU). - Capo d' Orso. Leg. E (SZU).

The circumscription of *Ramalina tingitana* is not clear to us. The specimens are much stouter in all parts and less densely pulvinate than *Ramalina breviscula*, and have straight or only slightly curved spores. EGGA & LLIMONA 1983: 58 report several stations for this lichen from

southeastern Spain. In Italy we have seen samples from Sicily and Pantelleria.

27 R. sp.

We are unable to assign this very characteristic saxicolous lichen with hollow, very brittle laciniae to any known species. KROG (in litt.) does not know the lichen either, and suggests to compare it with the type of *Ramalina mediterranea* H. Magn. The lichen, collected in several stations from central and northern Sardinia, is presently under revision.

138 Rhizocarpon

1 R. badioatrum (Flk. ex Spreng.) Th. Fr.

N - Arcu Correboi. Leg. E (GZU).

2 R. dimorphum Hertel et Leuck.

S - P.so La Variante, on *Protoparmelia montagnei*. Leg. E (SZU), M.

This species has been recently described as an obligate parasite on *Protoparmelia badia* by HERTEL & LEUCKERT 1979. Until now, it was only known from the Alps and central Spain.

3 R. disporum (Naeg. ex Hepp) Muell. Arg.

N - Villanova Strisaili, on Granite, 860 m. Leg. B.

This species is certainly more common in Sardinia, but has been probably overlooked.

4 R. distinctum Th. Fr.

N - Arcu Correboi. Leg. M.

5 R. episilum (Nyl.) Zahlbr.

C - S. Lucia. Leg. NP (GZU, TSB).

N - Rio Pardu, on *Pertusaria rupicola* v. *coralloidea* Leg. E (GZU).

S - M. Limbara, on *Pertusaria* sp. Leg. M.

This eumediterranean to Mediterranean-montane species is an obligate parasite on *Pertusaria rupicola*.

6 R. fraticida Poelt et Nimis spec. nov.

Typus: Sardinia, Prov. Cagliari. Punta Serpeddi', Gipfelschrofen, ca. 1000 m 19.7.1985. Leg. P.L. Nimis et J. Poelt (Holotypus GZU, isotypus TSB).

Parasitice viget in thallus *Rhizocarpi geographici* coll. Thallus, aliis

Rhizocarpi speciebus parasiticis comparatus satis grandis, ad 1.5 cm latus, coerulescenter atrigriseus, prothallo atro cinctus, acute areolatus. Medulla J+ violascens. Thallus K-, C-, KC-.

Apothecia immersa ad adnata, plana ad convexa, atra, non pruinosa. Epihymenium crassum, purpureiatrum, K+ distincte purpurascens. Sporae octonae ad pauciores, in statu maturo viridi-cinerascenter coloratae, ellipsoideae, uniseptatae, ca. 14-24 x 7-9.5 μ m metientes.

The thalli grow always on thalli of Rhizocarpon geographicum coll.; sometimes several thalli are confluent forming larger patches, single thalli measuring between 0.5 and 1 cm. When larger, the inner areolae are lost and there is a separation in several secondary thalli. All have a distinct prothallus, which spreads over the areoles of the host, a yellow Rhizocarpon. Thallus areolate, areoles more or less polygonal, with sharp edges, ca. 0.5-1 mm diam, plane, non-pruinose. thallus K-, C-, KC-, P-. Medulla J+ violet.

Apothecia common, dispersed or in groups, totally or only with the lower part immersed, roundish, black, ca. 0.3-0.7-(1) mm diam., plane to moderately convex. Excipulum reduced, with roundish cells, purple to black. Hypothecium also purplish black. Hymenium purplish, with thick purplish black epihymenium, ca. 150 μ m thick. Spores 8 or less, blackish grey-green, one-septate, more or less elliptic, with thick halo, 14-23 x 7-9.5 μ m. All purplish black parts K+ intensively purple.

Rhizocarpon fraticida seems to be related to Rhizocarpon simillimum, which differs in the non-parasitic habit, the smaller thallus and distinctly smaller spores. Also Rhizocarpon richardi may be related; it differs in the non-parasitic habit and the much larger spores. Host of Rhizocarpon fraticida in the type material is, at least in part, Rhizocarpon tavaresii, but several other host thalli are badly developed and not identifiable. The name derives from latin: fraticida = murderer of the own brother.

Further collections in Sardinia:

N - Rio Pardu. Leg. E (GZU).

S - Capo d' Orso, on Rhizocarpon tinei. Leg. E (GZU,TSB).

7 *R. geminatum* Koerb.

Syn.: Rhizocarpon disporum auct.

N - Bruncu Spina. Leg. NP (GZU). - Arcu Correboi, with Rhizocarpon badioatrum. Leg. E (GZU), M.

8 *R. geographicum* (L.) DC. s. lat.

C - M. Arcuentu. Leg. E (GZU,TSB). - P.ta Serpeddi'. Leg. NP (TSB).

- M. Maxias. Leg. Tretiach (TSB).

N - P.ta Paulinu. Leg. NP (TSB). - Arcu Correboi. Leg. E (GZU,TSB).

O - M. Ferru. Leg. Feige, det. Feuerer.

S - M. Limbara, on granite. Leg. E (SZU,TSB), M.

As several of the collections cited here were in poor condition, *Rhizocarpon geographicum* is thus treated here in a broader sense than current concepts of the species.

9 ***R. hochstetteri*** (Koerb.) Vain.

Syn.: *Rhizocarpon applanatum* Th. Fr.

C - S. Lucia. Leg. NP (GZU,TSB). - S. Pantaleo. Leg. Tretiach (TSB).

10 ***R. lusitanicum*** (Nyl.) Arnold var. ***lusitanicum***

C - P.ta Serpeddi', on *Pertusaria dealbescens*. Leg. NP (GZU). - M.

Arcuentu, on *Pertusaria* sp. Leg. E (GZU).

Rhizocarpon lusitanicum appears to be not rare in the Mediterranean area and is always parasitic on *Pertusaria*-species. The thalli of these specimens are clearly epikapylic and distinctly yellow. This lichen is very small and it has been probably often overlooked. According to EGEA & LLIMONA (1983: fig. 60) the species has been found several times in southeastern Spain.

11 ***R. lusitanicum*** var. ***ochrolechia*** Poelt et Nimis var. nov.

Typus: Sardinia Province of Cagliari, Giara di Gesturi, above Barumini, on basaltic rock, ca. 500 m. 20.7.1985. Leg. P.L. Nimis et J. Poelt (GZU).

Thallus endoparasiticus in thallo *Ochrolechia* parellae.

Thallus emortuus hospitis corrugatus et in colorem griseum mutatus. Apothecia superficialia, non raro confluentia, arcte adpressa, immarginata, valde convexa, aspera ad corrugata, atra. Excipulum hyphis parallelis conglutinatis formatum. Hypothecium rubriatrum. Epiphymenium crassum, atripurpureum, K+ intense purpurascens. Hymenium ca. 150 μ m altum. Sporae octonae vel pauciores, ca. 18-27/10-12.5 μ m, cellulis demum 5-9 in aspectu, halone crasso.

Rhizocarpon lusitanicum is, according to the few extant collections, a rather variable species. Typically, it develops a yellowish epikapylic thallus as in the case of the specimens cited as var. *lusitanicum*. In some collections the species grows mostly inside the host (*Pertusaria*-species), and only very rarely some yellowish patches can be seen; the internal thallus seems to be very irregular. The var. *ochrolechia* grows on a different host genus (*Ochrolechia*); its thalli seem to be more roundish, constantly immersed, the spores are similar to those of var. *lusitanicum*. More material is required, to see whether there is one variable taxon, or a group of specialized, but closely allied taxa in this group of parasitic *Rhizocarpon*-species,

where also the endokapylic thalli are clearly lichenized (see also POELT & HAFELLNER 1982, POELT 1985).

12 R. obscuratum (Ach.) Massal.

S - P.so La Variante. Leg. M.

13 R. oportense (Vain.) Raes.

C - Giara di Gesturi, on basaltic rock. Leg. NP (GZU, TSB). - M. Sette Fratelli. Leg. WP.

N - M. Mannu. Leg. NP (GZU). - Desulo on south-facing metamorphic rocks. Leg. NP (GZU, TSB).

This species was also known from the Iberian Peninsula.

14 R. polycarpon (Hepp ex Grog.) Th.Fr.

C - Isola di S. Pietro. Leg. Feige. - Below P.ta Serpeddi'. Leg. NP (GZU, TSB). - Nora. Leg. NP (GZU). - S. Lucia (1/2 Km W of -). Leg. NP (GZU).

N - Bruncu Spina. Leg. NP (TSB). - Arcu Correboi. Leg. E (GZU). - M. Arcueri. Leg. M.

S - M. Limbara. Leg. M.

Probably this species is not rare in the mountains or in moister sites in the lowlands.

15 R. richardi (Lamy) Zahlbr.

N - Arcu Correboi, on siliceous rock. Leg. et det. B., M.

The taxonomy of this lichen is still unclear.

16 R. simillimum (Anzi) Lettau

S - M. Limbara, very scarce, with *Rhizocarpon geographicum* and *Sporastatia testudinea*. Leg. E (GZU).

Since the thalli of this lichen are very small it has been probably largely overlooked.

17 R. tavaresii Raes.

C - P.ta Serpeddi'. Leg. NP (GZU), partly infested by *Rhizocarpon fraticida*.

The specimen corresponds well with the original description. *Rhizocarpon tavaresii* is a Mediterranean species, which is still rather poorly known.

18 R. tetrasporum Run.

N - Villanova Strisaili, on granite. Leg. B.

19 **R. tinei** (Tornab.) Run. s.str.

C - P.ta Serpeddi'. Leg. NP (GZU,TSB). - Isola di S. Pietro. Leg. Feige.

N - Bruncu Spina. Leg. NP (TSB).

S - Capo d' Orso. Leg. E (TSB).

The species is intended here in the sense of *Rhizocarpon tinei* subsp. *tinei* of RUNEMARK 1956: 122.

20 **R. umbilicatum** (Ram.) Jatta

N - M. Albo, on limestone. Leg. NP (TSB).

21 **R. viridiatrum** (Wulf.) Koerb.

N - Seui. Leg. M. - Desulo, on *Aspicilia*. Leg. NP (GZU). -

Bidicolai, on *Aspicilia* on granite. Leg. B.

S - Aggius (2 Km NNE from -). Leg. W.

139 *R h i z o p l a c a*

1 **R. chrysoleuca** (Sm.) Ach.

O - Busachi, on siliceous rocks. (MAMELI 1920:164, as *Lecanora chrysoleuca* var. *complicata* Ach.); we have not examined the specimen.

This species with a very wide distribution, on the European mountains typically occurs in the alpine vegetation belt, but it can grow at much lower elevation in dry areas. For more details see LEUCKERT et al. 1976.

140 *R i m u l a r i a*

1 **R. insularis** (Nyl.) Rambold et Hertel in Schedis ad: H. Hertel: *Lecideaceae exsiccatae* VIII:159.

Syn.: *Lecidea insularis* Nyl.

C - Nora. Leg. NP (GZU). - Below P.ta Serpeddi', on *Lecanora rupicola*. Leg. NP (GZU).

N - Arcu Correboi, on *Lecanora sulphurata*. Leg. E (GZU). - M. Limbara, on *Lecanora rupicola*. Leg. E (SZU), M.

This parasitic lichen, strictly confined to the *Lecanora rupicola*-group, is probably rather common on the island. We observed it in several other localities.

141 *Rinodina*

by H. MAYRHOFER

Epilithic species of this genus seem to be particularly well represented in the lichen flora of Sardinia. In earlier works, only a few species are cited (ARNOLD, 1872; BAGLIETTO, 1879; BARBEY, 1884). Most of the citations by BAGLIETTO have been checked on the basis of the samples preserved in MOD. The cited specimens have been studied mostly in accord with the monography by MAYRHOFER (1984). Further reports are in MAYRHOFER & POELT (1979) and MAYRHOFER & LEUCKERT (1985). Most of the epiphytic species can be identified using the good revision by MAGNUSSON (1947); some samples, however, remained unidentifiable. A revision of this group, particularly for the Mediterranean region, is badly required.

1 *R. alba* Metzler ex Arnold

C - Isola dei Cavoli. Leg. NP (GZU,TSB). - Below P.ta Serpeddi'.

Leg. NP (GZU). - Capo Pecora. Leg. E (GZU).

N - Torre Argentina. Leg. NP (GZU).

S - S. Teresa di Gallura, on granite. Leg. E (GZU,TSB). - Capo d' Orso, on granite. Leg. E (HbWB,GZU,TSB), B. - P.so La Variante. Leg. E (GZU).

This is an epilithic species on very hard siliceous rocks. It occurs along rocky coasts, from the litoral belt (salt spray) to ca.700 m in the coastal mountains (collections from Serpeddi' and P.so La Variante). *Rinodina alba* is a characteristic element of the Macaronesian-Mediterranean lichen flora (distribution map in MAYRHOFER 1984: 373).

2 *R. adpersa* (Borr.) Laund.

Syn.: *R. fatiscens* (Th.Fr.) Vain.

N - Rio Aratu. Leg. NP (GZU). - Arcu Correboi. Leg. M.

S - P.so La Variante. Leg. E (GZU).

The specimens from Rio Aratu and Arcu Correboi are sterile, the collection from P.so la Variante is fertile.

3 *R. arnoldii* Mayrh. et Poelt

N - Bruncu Spina. Leg. NP (GZU). - Arcu Correboi, with *Rhizocarpon geminatum*. Leg. E (GZU).

S - M. Limbara. Leg. E (GZU).

This species occurs on steeply inclined faces of basic siliceous rocks in the higher mountains.

4 R. atrocineria (Hook.) Koerb.

Syn.: *Rinodina tympanelloides* Bagl. ex Arnold

C - Capoterra. Leg. Canepa (ARNOLD 1872: 35; ZAHLBRUCKNER 1931:559; MAYRHOFER & POELT 1979:56; - Between S. Barbara and Cioffa. Leg. Canepa (MAYRHOFER 1984:378). - Road Arbus-Buggerru. Leg. E (HbWB).

N - Rio Madau. Leg. W.

S - Coddu Vecchiu (SW of Arzachena). Leg. B. - Capo d' Orso. Leg. E (GZU).

Rinodina atrocineria is a widespread species on hard silicates in the Atlantic floristic Region, occurring also in the western Mediterranean Basin. Its easternmost outliers are on the western coasts of Italy. According to LAUNDON (1986:176) the correct author citation is (Hook.) Koerb.

5 R. bischoffii (Hepp) Massal.

C - Alcais, near Cagliari. Leg. Canepa (MOD, BAGLIETTO 1879:79; BARBEY 1884: 105)

N - Esterzili. Leg. M - Grotta su Mammuri, 1 Km W of Ulassai, with *Rinodinella controversa*. Leg. B.

The identity of BAGLIETTO's material has been personally checked. *Rinodina bischoffii* is the most common epilithic species on limestone and other calcareous rocks in central Europe, occurring from the lowlands to the lower alpine belt. In the Mediterranean region this species is most frequent in the montane and upper montane belts.

6 R. colobina (Ach.) Th. Fr.

N - M. Ortobene. Leg. NP (GZU,TSB). - Seui. Leg. E (GZU). - Lanusei. Leg. M.

This species is characterized by the blue-grey to black thallus and by the blue-green epihymenium, changing to violet in KOH.

7 R. confinis Samp.

S - Tempio Pausania. Leg. M.

Rinodina confinis is characterized by its very large ascospores of *Mischoblastia*-type; it was hitherto only known from Portugal.

8 R. confragosa (Ach.) Koerb.

C - P.ta Serpeddi'. Leg. NP (GZU,TSB).

N - Seui. Leg. Marcucci. (MAYRHOFER & POELT 1979:90; BAGLIETTO 1879: 80; BARBEY 1884: 105, as *Rinodina metabolica* b) *saxicola*). - P.ta Palai. Leg. NP (GZU), B. - Bruncu Spina. Leg. NP (GZU,TSB). - Rio Aratu. Leg. NP (GZU). - Arcu Correboi. Leg. E (GZU). - Rio Pardu. Leg. E (GZU).

This species is widely distributed on various types of siliceous rock in Europe. It seems to be relatively common in Sardinia. According to MAYRHOFER & LEUCKERT (1985:122) four chemical strains are recognizable; studies on their distribution are planned.

9 R. corticola (Arnold) Arnold

C - Road Arbus-Buggerru. Leg. M. - From Arcu Neriddu to M. Sette Fratelli. Leg. WP.

N - M. Arcueri. Leg. E (GZU).

S - Aggius. Leg. W. - P.so La Variante. Leg. M.

Rinodina corticola is characterized by its whitish, K+ yellowish thallus, the ascospores of *Physcia*-type and the faint J+ blue reaction of the well developed cortex of the constricted apothecia. According to MAGNUSSON 1947: 250 *Rinodina corticola* seems to be a montane species with its distributional centre in the Alps, occurring also in the Mediterranean and submediterranean regions.

10 R. cretica Mayrh.

N - M. Albo. Leg. NP (GZU). - Between Cala Gonone and Dorgali. Leg. W.

The habitus of *Rinodina cretica* very much recalls that of *Rinodina immersa* (apothecia immersed in small pits within the limestone). It differs in having a different spore-type (*Bicincta*-type). This species was hitherto only known for the eastern Mediterranean region, extending eastwards to Crimea. The cited samples represent the most western known localities for this species.

11 R. dubyana (Hepp) Steiner

C - Sardegna Meridionale. Leg. Canepa (MAYRHOFER 1984: 407). - Cagliari. Leg. Canepa (MOD, BAGLIETTO 1879: 103, BARBEY 1884: 113, as *Buellia dubyana*).

Rinodina dubyana is a widespread species on limestone, most frequent in the submediterranean region.

12 R. exigua (Ach.) S. Gray

Syn.: *Rinodina oleae* Bagl. (according to SHEARD 1967:347), *Rinodina pruinella* Bagl.

C - Supra corticem Olearum circum Cagliari. Leg. Canepa (BAGLIETTO 1979: 80 and BARBEY 1884: 106)- Supra corticem Fici caricae ad Giorgino iuxta Cagliari. Leg. Canepa (MOD, holotype of *Rinodina pruinella*; BAGLIETTO 1879: 80, BARBEY 1884: 105).

N -Lanusei, on Juglans. Leg. E (TSB). - Orri. Leg. Canepa (BAGLIETTO 1879: 80, BARBEY 1884:106). - M. Ortobene, on Populus. Leg. NP

(GZU, TSB).

We have not been able to check the samples growing on *Olea* near Cagliari nor those from Orri. *Rinodina exigua* is a widely distributed species in Europe. MAGNUSSON (1947: 233) was not able to examine the type specimen of *Rinodina pruinella*. Unfortunately, his account is therefore misleading, since he only examined specimens of *Rinodina cintrana*, which he considered a synonym of *Rinodina pruinella*.

13 *R. fimbriata* Koerb.

N - P.ta Palai. Leg. NP (GZU, TSB).

Rinodina fimbriata occurs on periodically inundated boulders in creeks. It has been very rarely collected (see MAYRHOFER 1984: 411). The only other recent collection is from Sweden (Vaermland, Karlskoga, Lake Moeckeln. Leg. L.E. Muhr). All of the other known localities date back many decades. It is probable that several stations for this species have disappeared as a consequence of environmental changes.

14 *R. furfuracea* H. Magn.

C - Road Arbus-Buggerru. Leg. M.

N - P.ta Palai. Leg. NP (GZU).

S - Badesi Mare, on *Juniperus*. Leg. E (TSB).

This species is characterized by its furfuraceous thallus. It was hitherto only known from Portugal.

15 *R. gemarii* Bagl.

C - Capoterra. Leg. Marcucci (MOD). - Giara di Gesturi. Leg. NP (GZU, TSB). - Batumea, near Baressa. Leg. W - M. Arcuentu. Leg. E (GZU). - Capo Pecora. Leg. M. - Barumini. Leg. E (HbWB).

N - Desulo. Leg. NP (GZU). - Esterzili. Leg. M. - Seui. Leg. M. - Rio Pardu. Leg. WP (GZU). - Arcu Correboi. Leg. M.

O - Nuraghe Tradori. Leg. W.

S - SS. Trinita' di Saccargia, on a wall near the church. Leg. E (GZU, TSB).

It is possible that the citation of *Rinodina exigua* b) *saxatilis* (BAGLIETTO 1879: 80; BARBEY 1884: 106) should also be referred to *Rinodina gemarii*; we were not able to examine this collection. This species is the most common *Rinodina* of Sardinia, but the small thalli are often difficult to find between other crustose lichens. It has a remarkably wide distribution and ecological aptitude, occurring from various types of coastal rocks to rocky outcrops in inland habitats.

16 *R. immersa* (Koerb.) Arnold

S - Grotte di Nettuno. Leg. W.

Rinodina immersa is characterized by its immersed apothecia and is a widespread species on limestone, most frequent in the submediterranean region. It also occurs in the montane and subalpine belts of central Europe extending northwards to southern Scandinavia.

17 *R. lecanorina* (Massal.) Massal.

N - M. Albo, on limestone. Leg. NP (GZU,TSB). - Grotta Su Marmuri, ca 1 Km W of Ulassai, with *Rinodinella controversa*. Leg. B. - M. Arcueri. Leg. E (GZU).

Two further localities (S. Bartolomeo and Lanusei) by BAGLIETTO (1879: 79) and BARBEY (1884:105) have not been checked. The sample for the third locality cited by BAGLIETTO for this species (Flumini Bina) is *Rinodina trachytica*. *Rinodina lecanorina* is rather common on limestone in the submediterranean and warm-temperate regions. It is characterized by a grey thallus with immersed apothecia.

18 *R. luridescens* (Anzi) Arnold

N - M. Ortobene, on granitic boulders. Leg. NP (GZU). - Arcu Correboi. Leg. E (GZU).

S - S. Teresa di Gallura. Leg. M. - Capo d' Orso. Leg. E (GZU).

Rinodina luridescens is an epilithic species on hard siliceous rocks, widespread in the Atlantic and Mediterranean regions, from the coast to the lower montane coastal ranges (distribution map in MAYRHOFER 1984: 434).

19 *R. melanocarpa* Muell. Arg.

N - S' Arcu de Tascussi. Leg. NP (GZU).

The scanty material has a parasitic thallus with typical lecideine apothecia. This species is only known from very few localities in Europe.

20 *R. milvina* (Wahlenb.) Th.Fr.

N - S' Arcu de Tascussi. Leg. NP (GZU,TSB). - P.ta Paulinu. Leg. NP (TSB).

S - M. Limbara, on granite. Leg. E (GZU).

Rinodina milvina, besides its large arctic-alpine area, is known from several mountains of the Mediterranean region. It prefers sunny subhorizontal surfaces of slightly basic siliceous rocks and boulders.

21 *R. obnascens* (Nyl.) Oliv.

C - P.ta Serpeddi'. Leg. NP (GZU,TSB).

N - Desulo. Leg. NP (GZU).

The sample from the first locality is sterile. *Rinodina obnascens* is

parasitic on Rhizocarpon and Aspicilia and was previously known in a fertile state from only a few localities in France and Spain.

22 R. occulta (Koerb.) Sheard

Syn.: *R. confragosa* b) *lecideina* (Flot.) Koerb.

N - Arcu Correboi. Leg. E (GZU). - Rio Pardu, in deep shade under an overhanging rock. Leg. E (GZU).

? - without locality. JATTA 1900: 279.

The identity of the material cited in Jatta's reference has not been checked. *Rinodina occulta* is a very small species, which occurs on vertical or overhanging siliceous rocks.

23 R. oxydata (Massal.) Massal.

N - Rio Aratu. Leg. NP (GZU). - M. Mannu. Leg. NP (GZU). - Seui. Leg. M.

S - Torralba. Leg. E (HbWB).

? - Without locality. Leg. Moris (MOD).

The citation of *Rinodina "oxidata squamulosa"* Bagl. (BAGLIETTO 1879: 79 and BARBEY 1884: 105) should be referable to *Rinodina oxydata*, in so far as we are able to judge by checking the identification of the specimen collected by Moris. *Rinodina oxydata* occurs in mainly humid habitats. There are not many localities for this species known in the Mediterranean region, but it is common in the temperate zone, extending to the submediterranean region in Europe.

24 R. plana H. Magn.

C - Portixeddu, on Acacia. Leg. E (GZU).

Rinodina plana was previously known only from Yugoslavia.

25 R. pyrina (Ach.) Arnold

C - Barumini, on Prunus. Leg. E (GZU,TSB). - Batumea, near Baressa. Leg. W.

N - S' Arcu de Tascussi, on Alnus. Leg. NP (GZU,TSB).

Rinodina pyrina is a rather common corticolous species in Europe. It often occurs on small twigs and occasionally on wood. It is one of the pioneer species of young twigs.

26 R. sicula Mayrh. et Poelt

C - Below P.ta Serpeddi'. Leg. NP (GZU).

N - P.ta Palai. Leg. NP (GZU).

Rinodina sicula is a rare but also easily overlooked species. It occurs in very small patches between other epilithic crustose lichens. For another interesting record from the island of Elba see MAYRHOFER &

LEUCKERT 1985: 126.

27 *R. sophodes* (Ach.) Hellb.

C - Ad truncos Ceratoniae et Ailanti circum Cagliari. Leg. Canepa.
N - Orri. Leg. Canepa. - S'Arcu de Tascussi, on Quercus. Leg. NP (GZU,TSB). - Villanova Strisaili, on Alnus. Leg. B - Arcu Correboi, on Quercus. Leg. B. - Seui, on Ulmus. Leg. E (TSB). - Between Desulo and Fonni, on Pyrus. Leg. W - M. Arcueri, on Quercus and Ostrya. Leg. E (GZU).

The two specimens collected by Canepa are cited in BAGLIETTO (1879: 79) and BARBEY (1884: 105). Probably the citation by MAMELI (1920: 168: *Rinodina albana* var. *orbicularis*) also includes this species. *Rinodina sophodes* is characterized by ascospores of the *Milvina*-type, the faint J + blue reaction of the well developed apothecial cortex, and the usually rather constant greyish olive brown thallus. It is a widely distributed species in Europe.

28 *R. soredata* H. Magn.

N - Seui. Leg. E (GZU).

Rinodina soredata is characterized by its grey soresdate thallus. It was hitherto known only from Portugal and the Canary Islands (CRESPO & BUENO 1982: 343).

29 *R. subglaucescens* (Nyl.) Sheard

New synonyms: *Rinodina beccariana* BAGLIETTO 1871: 239. Type: Italy, Toscana. M. Pisano, Valle delle Fonti. Leg. Beccari, 1862 (MOD, Holotype).

Rinodina beccariana a) *cinerea* BAGLIETTO 1879: 78. Type: Sardinia: inter S. Barbara et Cioffa. Leg. Canepa (MOD, Holotype).

Rinodina beccariana b) *tympanelloides* BAGLIETTO 1879: 78. Typus: Sardinia: Monte di Capoterra a S. Lucia. Leg. Canepa (MOD, Holotype).

C - Capoterra. Leg. Canepa (MAYRHOFER 1984:461). - Giara di Gesturi. Leg. NP (GZU,TSB). - M. Arcuentu. Leg. M. - Capo Pecora. Leg. E (TSB).

N - Stintino. Leg. B (MAYRHOFER & LEUCKERT 1985: 126). - Bosa. Leg. B. (MAYRHOFER & LEUCKERT 1985: 126). - Torre Argentina. Leg. NP (GZU,TSB). - M. Mannu. Leg. NP (GZU).

S - Torralba. Leg. M - P.so La Variante. Leg. M. - S. Teresa di Gallura, on granites along the coast. Leg. E (TSB), M.

Rinodina subglaucescens is widespread in the Macaronesian-Mediterranean region. It occurs on different types of siliceous rocks (sometimes even

on decaying tufts of *Armeria*, P.W. James, in litt.) from the coast to the lower montane belt of the coastal ranges. Closely related, but probably new, is a species which also occurs in Sardinia. This is mostly parasitic on other crustose lichens (especially on *Pertusaria* spp.). Besides the parasitic habit, it is characterized by the dispersed, sublobate thallus. The species seems to be more or less confined to coastal habitats. A revision of this species complex is in preparation. MAYRHOFER & POELT (1979) and MAYRHOFER (1984) have included this species in *Rinodina subglaucescens* because of the previous lack of well developed material and insufficient information about its ecology.

30 *R. teichophila* (Nyl.) Arnold

C - M. Arcuentu. Leg. E (GZU).

N - M. Arcueri. Leg. E (GZU).

S - S. Lucia of Bonorva. Leg. B.

Rinodina teichophila is a widespread, but rather rare, species in Europe, reaching the submediterranean region. It prefers nutrient-enriched substrates, such as walls, bricks or gravestones. It is characterized by the dark grey to ochraceous thallus, the subimbrate apothecia and the large ascospores.

31 *R. trachytica* (Massal.) Bagl. et Car.

C - Capoterra. Leg. Canepa (MOD). - S. Barbara. Leg. Canepa (MOD).

- Giara di Gesturi. Leg. NP (GZU,TSB). - Flumini Bina. Leg. Canepa (MOD) (in BAGLIETTO 1879:79 and BARBEY 1884:105 cited as *Rinodina lecanorina*).

S - Torralba, on basaltic rock. Leg. E (HbW).

Rinodina trachytica is an epilithic lichen on magmatic and volcanic rocks, widespread in the submediterranean region.

32 *R. tunicata* Mayrh. et Poelt

C - Cagliari. Leg. Canepa (MOD, MAYRHOFER 1984:470).

N - M. Albo. Leg. NP (GZU).

Rinodina tunicata is a relatively common species on limestone in the Mediterranean and submediterranean regions.

33 *R. vetchae* Mayrh.

C - M. Arcuentu, on basaltic rock. Leg. E (HbW).

N - Torre Argentina. Leg. NP (GZU).

These are the most southern localities for this species with a very scattered distribution.

142 *Rinodinella*

We have not been able to check MAMELI's references. Both species of *Rinodinella* are widespread on limestone in the submediterranean and Mediterranean regions.

- 1 *R. controversa* (Massal.) Mayrh. et Poelt
N - Grotta Su Mammuri, on limestone. Leg. B. - M. Urpinu (MAMELI 1920: 168, as *Rinodina crustulata*)
- 2 *R. dubyanoides* (Hepp) Mayrh. et Poelt
N - Above Orani, M. Gonnara. Leg. Mameli (MAMELI 1920: 170, as *Buellia dubyanoides*). - M. Albo, on limestone. Leg. NP (GZU,TSB).

143 *Roccella*

Several specimens of *Roccella* collected by the authors have been revised by B. Feige.

- 1 *R. fuciformis* (L.) DC.
C - Isola dei Cavoli. Leg. NP (GZU,TSB). - Cagliari, ad arbores vetustas putrescentes. Leg. Moris (MOD, BAGLIETTO 1879:66). - Between Teulada and Pula. Leg. Feige. - Porto Scuso. Leg. Feige. - M.Arbus, S. Antioco. Leg. Feige. - Capo Malfatano. Leg. Feige. - Calasetta. Leg. Feige. - Capo S. Elia (COLOSI 1917:461).
N - Flumini- Bina. Leg. Canepa (BAGLIETTO 1879:66). - Isola di S. Antioco. Leg. Brizzi (TSB).
S - P.ta Falcone. Leg. Feige. - ibid. Leg. Pertot (TSB). - Between Castelsardo and the Elephant Rock. Leg. Feige. - Capo d' Orso, on granite. Leg. E (GZU,SZU,TSB), M. - Palau, on granite. Leg. F.Ceni (TSB).

After *Roccella phycopsis*, this is the commonest *Roccella* species along Italian coasts (also in the southern Adriatic Sea, specimens in TSB). It is less heliophytic than *R. phycopsis*, often occurring in shady niches of the rock, or on north-facing cliffs, often in places that are not directly wetted by rain.

- 2 *R. phycopsis* (Ach.) Ach.
Syn.: *Roccella fucoides* Vain.
C - Isola dei Cavoli. Leg. NP (GZU,TSB). - Calasetta. Leg. Feige. - Cagliari, Promontorio S. Elia (MOD, BAGLIETTO 1879:66) - Between Teulada and Pula. Leg. Feige. - M.Arbus, S. Antioco. Leg. Feige. -

Isola di S. Pietro. Leg. Feige. - Capo Malfatano. Leg. Feige. - M. Linas. Leg. Feige. - Portoscuso (MAMELI 1920:171) - S. Barbara presso Cagliari (COLOSI 1917:461).

N - M. Mannu. Leg. NP (GZU,TSB). - Flumini-Bina. Leg. Canepa (MOD, BAGLIETTO 1879:66). - Cala Fuili, on limestone. Leg. Wallnoefer (HbWB).

O - Tharros. Leg. Feige. - Oristano, S.ta Giusta. Leg. Feige, B. - Paulilatino (MAMELI 1920: 171).

S - Capo Caccia. Leg. NP (TSB), Feige. - P.ta Falcone. Leg. NP (TSB), Feige, Pertot (TSB). - Isola di Caprera. Leg. Gestro (MOD, BAGLIETTO 1879: 66). - Nuraghe Losa. Leg. Feige. - Between S. Teresa and Capo Testa. Leg. Feige. - S. Teresa di Gallura, on granite. Leg. E (GZU, TSB), M. - Capo Orso, on granite. Leg. E (GZU), M. - Palau. Leg. F. Ceni (TSB). - M. Russu. Leg. E (SZU).

This is the most common *Roccella* along the Italian coasts, often colonizing entire vertical rock faces. It also rather frequently occurs on lignum.

3 *R. tinctoria* DC.

S - P.ta Falcone. Leg. W (GZU).

The identification of this collection is not certain; the specimen is small, is richly fertile and has no soralia.

4 *R. vicentina* (Vain.) Vain.

Syn.: *Roccella tuberculosa* Vain. var. *vicentina* Vain.

C - Isola dei Cavoli. Leg. NP (GZU,TSB). - Capo Malfatano. Leg. Feige. - M.Arbus, S.Antioco. Leg. Feige. - M. Linas. Leg. Feige.

S - P.ta Falcone. Leg. NP (GZU), Feige, Pertot (TSB). - Castelsardo. Leg. Feige. - Between Santa Teresa and Capo Testa. Leg. Feige. - S. Teresa di Gallura, on granite along the coast. Leg. E (GZU,TSB), M. - Capo Orso, on granite. Leg. E (GZU,TSB), M.

This species seems to have a western distribution along the Mediterranean coast. For its distribution in southeastern Spain see EGEA & LLUMONA 1983: fig. 66.

144 *Sagiolechia*

1 *S. protuberans* (Ach.) Massal.

N - M. Albo, on limestone. Leg. NP (GZU).

For a discussion of the taxonomy and distribution of this widespread lichen see VEZDA 1967.

145 S a c c o m o r p h a

In the recent efforts to subdivide the old, heterogeneous genus *Lecidea* in more narrowly defined and natural units, the *Lecidea uliginosa*-complex has been independently and almost at the same time separated as a distinct genus. In both cases old, forgotten, generic names were resuscitated: COPPINS & JAMES 1984 used the name *Placynthiella* GYELNIK 1939:187, whereas HAFELLNER 1984: 334 adopted the name *Saccomorpha* ELENKIN 1912:18. Later it was discovered that Elenkin, already in 1909, used the name *Placynthiella* for the lichen that he called *Saccomorpha* in 1912. The same name was independently used by Gyelnik because of a certain resemblance with some species of *Placynthium*. In a recent paper by COPPINS et al. (1987) the name *Placynthiella* Elenkin is considered as valid, which would bring into synonymy the names *Saccomorpha* Elenkin and *Placynthiella* Gyelnik. We wondered whether this is actually true, i.e. whether it is possible that Elenkin, in the description of *Saccomorpha* (1912), could forget to have used the name *Placynthiella* for the same lichen; we thought that he could have not used again the name *Placynthiella* since he did not consider this name as validly published.

The paper of ELENKIN 1919 is written in Russian. In order to solve the problem, we asked Dr. E. JAEGER (Halle/Salle), who has a very good knowledge of Russian, to translate the part of the paper devoted to *Placynthiella*, which he very kindly did. In the following we give his original translation into German, which is contained in a description of vegetation on open sandy soil. For completeness we report also some introductory sentences, that have nothing to do with *Placynthiella*:

"Eine untergeordnete Stellung nehmen *Cladonia rangiferina* (L.) Web. und *Cetraria islandica* (L.) Ach. ein. Am charakteristischsten aber für die offenen Sandplätze sind folgende Arten: *Stereocaulon condensatum* Hoffm.; diese Flechte entwickelt sich gewöhnlich sehr intensiv auf den Hängen der Hügel, (sie) nicht selten bedeckend mit fast geschlossenen Polstern aus grau-weißen, schuppig-körnigen Phyllocladien und Miniaturpodetien mit reichlicher Fruchtbildung; bisher gelang es mir nicht, diese Art in Mittelrussland anzutreffen. Zusammen mit *S. condensatum* wächst gewöhnlich *Cladonia verticillata* Hoffm., seltener *Cl. coccifera* (L.) Willd.; ziemlich häufig kommen auch *Baeomyces roseus* Pers. und *B. byssoides* (L.) Schaer. f. sessilis Nl. vor. Aber besonders interessant ist hier die reichliche Verbreitung der eigenartigen krustenförmigen Flechte *Placynthiella arenicola* Elenkin nov. sp. et nov. gen., die schwarzliche Fladen direkt auf dem Sand bildet. An Stellen, die der Windwirkung ausgesetzt sind, bilden sich die flachen Fladen, je nachdem wie der Sand an ihre Peripherie weggeblasen wird, allmählich in kegelförmige oder halbkugelige Gebilde um. Überhaupt ist die Biologie dieser Flechte, als eine der ersten Pioniere der

Pflanzenwelt, die die Dünensande befestigen, ausserordentlich interessant, und sie verdient genauere Untersuchung. Nicht weniger interessant ist auch die Morphologie dieser Art, besonders die Beziehung ihrer Pilzkomponente zu den Conidien, welche hier zum Stigonema-Typ gehören. Detaillierte biologische und morphologische Beobachtungen über Placynthiella arenicola werden von mir in einem besonderen Artikel dargelegt werden, der in näher Zukunft erscheinen wird".

In our opinion this clearly demonstrates that Placynthiella Elenkin is a *nomen nudum*. There is no citation of any character, which could be considered as important at generic level. "Schwarzliche Fladen" are formed by many lichens and Elenkin was not the type of lichenologist which could have considered this as a valid description. The last sentence clearly states that a detailed description of the lichen would have followed shortly. This happened in 1912, with a different nomenclature, i.e. with the change of the generic name from Placynthiella to Saccomorpha. In the 1912 paper the intention of the author to describe a new taxon is clear. In the German translation (207) there is the following statement: "Diese eigenartige Flechte wurde bereits unter dem Namen Placynthiella arenicola Elenk. nov. sp et nov. gen. in meiner Abhandlung...Seite 18 und 21 erwähnt. Meine weiteren Untersuchungen ergaben jedoch, dass die ursprüngliche Benennung dieser Flechte, die auf ihre Verwandtschaft mit der Gattung Placynthium (Ach.) Harm., hinweist, nicht ganz zutreffend war, weil diese Art eine völlig isolierte Stellung im Flechtensystem einnimmt". Here it is clear that Placynthiella arenicola of ELENKIN 1909 is not considered as a validly described taxon. The valid name for the Lecidea uliginosa complex is therefore Saccomorpha ELENKIN 1912 and not Placynthiella ELENKIN 1909.

To complete the picture, we add that the same lichen colonizing sand dunes was independently described also by KUPFFER 1924, under a much older species name, i.e. as "Stereonema chtonoblastes A. Braun ex Kützing (em. K.R. Kupffer)". Stereonema chtonoblastes was described as early as 1849 by A. Braun ex KÜTZING (p. 891), with the following locality and habitat quotation: "in arena mobili ad litum sinus Codani prope Danzig, leg. cl. Klinsmann". What lichen is here involved, whether Saccomorpha uliginosa, or Saccomorpha hyporrhoda (Th. Fries) Clauz. et Roux, which was described later, is a question that should be solved by examining the type material. In any case the generic name Stereonema cannot be taken into consideration for the lichens of the Lecidea uliginosa complex. The genus was described as monotypic, based on St. asperum (KÜTZING 1845:128), with the following note "unter verwesender Cladophora fracta, welche in Wasser aufbewahrt wurde". This cannot be our lichen.

- 1 **S. icmalea** (Ach.) Clauz. et Roux
N - P.ta Palai. Leg. NP (GZU).

- 2 **S. uliginosa** (Schrad.) Hafellner
N - M. Limbara on soil. Leg. E (GZU, SZU, TSB).

146 Sarcogyne

- 1 **S. privigna** (Ach.) Anzi
N - Lanusei. Leg. E (GZU). - P.ta Palai. Leg. Pertot (TSB).
S - Tavolara. Leg. Brizzi (TSB).
- 2 **S. pruinosa** (Sm.) Mudd
C - "Ad arenariam secus viam Pirri inque praedio Comitum Mossa iuxta Cagliari." Leg. Gennari, Canepa (MOD, BAGLIETTO 1879: 104)
N - Esterzili. Leg. M. - M. Arcueri, on limestone. Leg. E (HbWB).
S - Nuraghe S. Antine, on the walls of a house. Leg. E (HbWB, TSB).
The name *Sarcogyne pruinosa* has been substituted by *Sarcogyne regularis* by most recent authors. As we have formed the impression that *Sarcogyne regularis*, in the original sense, is a different and much rarer taxon, we retain the old name *Sarcogyne pruinosa* until the complex has been clarified.

147 Schaereria

- 1 **S. tenebrosa** (Flot.) Hertel et Poelt
Syn.: *Lecidea tenebrosa* Flot.
C - Below P.ta Serpeddi'. Leg. NP (GZU). - S. Lucia, with *Rhizocarpon hochstetteri*. Leg. NP (GZU).
N - P.ta Paulinu, with *Lecidea deustata*. Leg. NP (GZU, TSB). - Arcu Correboi. Leg. E (GZU, TSB).
S - M. Limbara. Leg. E (GZU).
The species is probably not rare on the highest mountains.

148 Schismatomma

- 1 **S. decolorans** (Turn. et Borr.) Clauz. et Veřža
N - Lanusei, on an old oak, with *Enterographa crassa*. Leg. E (TSB).
Schismatomma decolorans is a subatlantic species. In Italy it seems to be much rarer than in earlier times. It grows on the dry sides of the boles of old trees with acid bark, mostly in the lowlands; recent stations are from northern Italy (Trieste) and the Tyrrhenian coast from Tuscany to south Latium (TSB).

2 **S. picconianum** (Bagl.) Steiner

Syn.: *Schismatomma diplotommoides* (Bagl.) Samp.

C - "In cortice Oleae ex horto academico Cagliari, ad *Ceratoniae truncos* Orri (Canepa) (BAGLIETTO 1879:80, as *Lecania picconiana*).

N - P.ta Falcone, on *Juniperus*. Leg. NP (GZU,TSB).

149 **Sclerococcum**

1 **S. sphaerale** (Ach.) Fr.

C - P.ta Serpeddi', on *Pertusaria dealbescens*, det. J. Hafellner.

Leg. NP (GZU). - Barumini, on *Pertusaria*. Leg. E (GZU).

The distribution of this lichenicolous fungus, confined to species of *Pertusaria*, is poorly known in the Mediterranean region.

150 **Scoliciosporum**

1 **S. gallurae** Vězda et Poelt spec. nov.

Typus: Sardinia, Prov. Cagliari. Arcu Neriddu, M. Sette Fratelli, 2.5 Km ca. 500 m. Leg. Wittmann et Pilsel (GZU). Paratypus: Sardinia, Prov. Sassari, Passo La Variante, on *Pyrus* with *Evernia prunastri* and *Lecidella* sp. Leg. H. Mayrhofer (GZU).

Species nova ex affinitate *Scoliciospori chlorococci* (Stenham.) Vězda a qua differt ascosporis vulgo 3-septatis, rarius simplicibus vel 1-septatis, ellipsoideis vel fusiformibus (ad naviculaeformibus), rectis, arcuatis vel leviter contortis, 15-22 x 4-5 μ m (ascosporae *Sc. chlorococcae* + 7-septatae, 20-40 x 4-5 μ m).

Thallus corticola, leprosus, viridis. Apothecia depresso-globosa, pallide fusca vel atrofusca, ca. 0.3 mm in diametro. Paraphyses tubulis 1.5 crassis. Ascosporae variabiles.

This new lichen is very small and difficult to observe. It differs from *Scoliciosporum chlorococcum* even in the general habit. The most distinctive character is the spore-type. The holotype is associated with *Lecidella achristotera*, the paratype with *Evernia prunastri*, *Lecanora carpinea* and *Lecidella achristotera*. The name comes from Gallura, the northeastern part of Sardinia, where the paratype has been collected.

2 **S. umbrinum** (Ach.) Arnold

N - M. Arbo, on the siliceous stones of a wall. Leg. E (TSB).

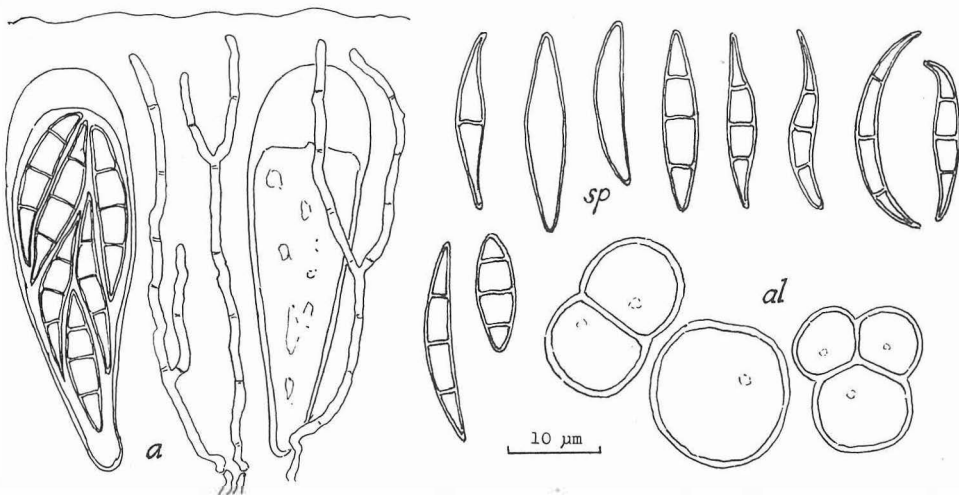


Fig. 10 - *Scoliciosporum gallurae* Vežda et Poelt
 a) asci and paraphyses
 sp) spores
 al) algae.

151 S k y t t e a

1 *S. sp.*

S - Torralba, on *Aspicilia*, with *Pleospilis sp.* Leg. M.

152 S o l e n o p s o r a

The genus *Solenopsora* is much in need of a revision; some of the identifications may be incorrect.

1 *S. bagliettoana* C. Tav.

Syn.: *Solenopsora cesatii* var. *grisea* Bagl.

C - Alcais, Cagliari. Leg. Canepa (MOD, BAGLIETTO 1879:70, as *Ricasolia gennarii* b) *grisea*).

N - M. Albo, on limestone. Leg. NP (GZU, TSB).

2 **S. candicans** (Dicks.) Steiner

N - M. Albo, on limestone. Leg. NP (GZU,TSB). - M. Arcueri, on limestone. Leg. E (TSB). - Esterzili. Leg. E (GZU).

This is a Mediterranean-subatlantic species in Europe, growing on basic substrates.

3 **S. cesatii** (Massal.) Zahlbr.

S - Tavolara, on limestone. Leg. Brizzi (TSB).

? - "Super terram calcaream compactam in herbario Moris" (BAGLIETTO 1879:70).

4 **S. holophaea** (Mont.) Samp.

S - Stintino, on soil in fissures of acid rock. Leg. B. - M. Russu, on soil over granite. Leg. E (HbWB, TSB).

This is an western lichen, known from Ireland and southwest Norway to the Canary Islands (MITCHELL 1961: 211), and also southeastern Spain, where it occurs along the coast (EGEA & LLIMONA 193: fig. 38). It grows on siliceous rocks, mostly within more or less sheltered fissures, or on bare soil. It is usually reported as more or less restricted to the coast, particularly in the northern part of its range, but in Tenerife occurs to 1800 m (specimens in TSB).

5 **S. olivacea** (Fr.) Kilius

Syn.: Catillaria olivacea Fr.; Placodiella olivacea (Fr.) Szat.

C - Buggerru, on limestone. Leg. E (HbWB,TSB), M. - Baia Chia, on calcareous sandstone. Leg. NP (GZU).

N - M. Arcueri. Leg. E (GZU).

S - Capo Caccia. Leg. NP. Det. Kilius (GZU,TSB).

6 **S. vulturiensis** Bagl.

C - Riola (6 Km W of -). Leg. WP. - Baia Chia, on calcareous sandstone. Leg. NP (TSB).

Solenopsora vulturiensis is a Mediterranean species; in Italy it is known from coastal Latium, Tuscany and Liguria.

153 Sphaerophorus

1 **S. globosus** (Huds.) Vain.

Syn.: Sphaerophorus coralloides Pers.

C - "Altare di Flumini-bina sopra Orri nella Sardegna Meridionale" 1867. Leg. Canepa (Erb. Crittogam. Ital. Ser. II:224; cited also by BAGLIETTO 1879:111).

N - Bruncu Spina, on North exposed rocks. Leg. NP (GZU,TSB). - P.ta Palai, on rock. Leg. WP.

A temperate to subarctic-circumboreal species, with outliers in the southern hemisphere. In Italy it is rather rare on high mountains with a high rainfall.

154 *Sphinctrina*

We are certain that the representatives of this genus are not rare in Sardinia; they have been probably overlooked also by us. For a discussion of the various species see LÖFGREN & TIBELL 1979.

1 *S. leucopoda* Tuck.

C - P.to S. Stefano. Leg. NP (GZU).

The specimen was identified by L. Tibell. The identification is not completely certain since the spores were immature.

2 *S. tubiformis* Massal.

C - "Super thallum Pertusariae alpinae Gioffa prope Cagliari (Canepa)" (BAGLIETTO 1879: 94; we have not seen the specimen).

3 *S. turbinata* (Pers. ex Fr.) De Not.

N - Arcu Correboi, in small fissures of subvertical acid rock, the host is not identifiable. Leg. E (GZU). - Cala Gonone, on *Pertusaria pertusa* growing on *Quercus ilex*. Leg. W (GZU,W).

A species of the temperate to hemiboreal zones in Europe.

155 *Sporastatia*

The citation of *Sporastatia cinerea* Krb. (= *S. polyspora* (Nyl.) Grumm.) by MAMELI 1920: 170, from Busachi (Oristano) is probably a misidentification, since the village is situated at only 379 m, an altitude well below the possible range for this species.

1 *S. testudinea* (Ach.) Massal.

N - Bruncu Spina, on acid rock. Leg. NP (GZU,TSB).

S - M. Limbara, on granite. Leg. E (GZU, HbWB).

Also cited by BAGLIETTO 1879:104, without locality, from the herbarium Moris. This more or less arctic-alpine species is confined to sites at highest elevation in Sardinia.

156 *Squamarina*

1 *S. cartilaginea* (With.) P. James

Syn.: *Squamarina crassa* (Huds.) Poelt

C - M. Santo di Pula. Leg. Canepa (MOD, BAGLIETTO 1879: 68). - M. S. Elia. Leg. Feige. - Isola di S. Pietro. Leg. Feige. - Barbusi. Leg. WP. - Cagliari (COLOSI 1917:466).

N - M. Albo, on calcareous soil. Leg. NP (TSB). - Cala Gonone. Leg. B. - M. Arcueri, on calcareous soil. Leg. E (TSB), M. - Esterzili. Leg. M. - M. Arbo. Leg. M, E (TSB). - Supramonte di Oliena, on calcareous rock. Leg. W. - Between Cala Gonone ad Dorgali. Leg. W.

O - Nuraghe S. Barbara. Leg. Feige.

S - Torralba, on mosses and soil on basaltic rock. Leg. E (HbWB,TSB). - Altopiano di Campeda. Leg. B. - Grotte di Nettuno. Leg. W. - Tavolara. Leg. Brizzi (TSB).

Under this name we include the collections with a medulla which reacts P+ yellow (psoromic acid) and those which have not been tested. Those reacting P- are placed under the following taxon. *Squamarina cartilaginea* is a common species on basic soil, occurring throughout the Mediterranean, extending to southern Norway, Macaronesia, North Africa, Asia Minor and the Ukraine.

2 *S. cartilaginea* v. *pseudocrassa* (Mattick) D.L. Hawksw.

C - Isola di S. Pietro. Leg. Feige.

N - Arcu Correboi, on basic soil. Leg. B.

O - Nuraghe Ruiu. Leg. Feige

See also note to the preceding taxon.

3 *S. ~~concreta~~* (Muell.Arg.) Poelt

C - M. Arcuentu, on soil over acid substrate. Leg. E (TSB).

N - Desulo, on soil. Leg. NP (GZU,TSB).

This is a Mediterranean species in Europe, ranging southwards to the Canary Islands (TSB). It has probably an ecology and distribution similar to *Toninia toepfferi*, *Trapeliopsis wallrothii* and *Solenopsora holophaea*, with which it is frequently associated. However, it does not occur in Britain which the two latter species do (P.James, in litt.).

4 *S. gypsacea* (Sm.) Poelt

N - M. Albo, on limestone. Leg. NP (TSB).

S - Isola di Caprera. Leg. Pasquale. (MAMELI 1920:164); we did not see the specimen.

This species has two centres of distribution: in the alpine vegetation belt of the calcareous Alps and in the Mediterranean area, where it is

found mostly in sheltered sites.

5 **S. lentigera** (Web.) Poelt

C - Promontorio S. Elia. Leg. Gennari (MOD, BAGLIETTO 1879: 68, as *Placodium lentigerum*). - Cagliari (COLOSI 1917:466).

S - Anghelu Ruju. Leg. W.

Squamarina lentigera prefers dry, open habitats with semi-desert conditions.

6 **S. oleosa** (Zahlbr.) Poelt

N - M. Albo, sterile. Leg. NP (GZU), identification not certain.

This species is known only from a few collections; it can only be identified with certainty by spore length.

7 **S. periculosa** (Duf.) Poelt

N - Between Cala Gonone and Dorgali, with *Squamarina cartilaginea*. Leg. W.

This is a very characteristic lichen with an eumediterranean distribution which is much rarer than *Squamarina cartilaginea* or *Squamarina concrescens*.

8 **S. sardoa** H. Vänškä ined.

N - Bruncu Spina. Leg. NP (GZU,TSB).

This small lichen, belonging to the section *Petroplaca*, will be probably described as a new species by H. Vänškä.

9 **S. stella-petraea** Poelt

N - M. Albo. Leg. NP (GZU,TSB).

Squamarina stella-petraea, described on the basis of a few collections, can easily be distinguished from *Squamarina cartilaginea* in the field where both are together. Isolated, poorly developed specimens may be difficult to identify.

157 **S t a u r o t h e l e**

1 **S. hazslinskyi** (Koerb.) Blomb. et Forss.

N - Desulo on schist. Leg. NP (TSB).

Our specimens corresponds well to the type material of the species.

2 **S. terricola** (Bagl.) Poelt et Nimis **comb. nov.**

Basion.: *Polyblastia terricola* BAGLIETTO 1879: 113.

Typus : "Super terram in finitimis Cagliari (Genn.)" MOD: holotypus.

In the type material (MOD) the perithecia of this species contain quadrat to rectangular hymenial algae. The thallus is crustose, never squamulose. Thus, in spite of being terricolous, the species has to be transferred to Staurothele, waiting for a revision of the whole complex Staurothele-Endocarpon.

158 *Stereocaulon*

We were surprised that we did not find any representatives of this genus during our field-work. In Sardinia there are many rock-types, especially volcanic, suitable for several species of this genus.

1 *S. vesuvianum* Pers.

? - "Ad terram saxaque monte Santo Torralba". Leg. Moris. (BAGLIETTO 1879: 93; specimen not seen by us).

A widely distributed and polymorphic species, occurring in both hemispheres, from the Arctic to the Antarctic zones.

159 *Stigmidium*

1 *S. atryneae* (Arnold) Hafellner

N - Arcu Correboi, on *Lecanora swartzii* in an overhang of siliceous rock. Leg. E (GZU). Det. J. Hafellner.

2 *S. glebarum* (Arnold) Hafellner comb. nov.

Basion.: *Arthopyrenia glebarum* Arnold, Flora 70: 152, Tab.III,fig.7 (1887).

N - Dorgali, between Punta Sorichina and M. Tului, 470-500 m., on *Toninia* sp. Leg. B.

Stigmidium glebarum is a rare species, which grows exclusively on *Toninia* species. ARNOLD (1887) and VOULUX (1912) report this species from Germany, France and the Isle of Corfu.

The fruiting bodies of this lichenicolous fungus are scattered in great numbers on the areoles of the host. A good microscopic character is the spore-size, which measures 10-13 (-14) x 2.5-3.5 μ m; the spores are not constricted at the septum.

3 *S. schererii* (Massal.) Trev.

C - Road Arbus-Buggerru, on *Lecidella elaeochroma*. Leg. M.

N - Urzulei (ca. 1 Km W of Genna Sarbene), on *Alnus morisiana*, 700-725 m. Leg. B.

The specimen from Urzulei was parasitic in the apothecia of *Lecanora* cf. *chlarotera*.

160 *Synalissa*

1 *S. symphorea* (Ach.) Nyl.

N - Torre Argentina, on tuff. Leg. NP (GZU), det. H. Schiman-Czeika.

161 *Teloschistes*

1 *T. flavicans* (Sm.) Norm.

N - Ad basaltas circum Macomer. Leg. Marcucci (MOD, BAGLIETTO 1879:59 as *Physcia flavicans*).

O - M. Ferru. Leg. Feige.

This is an oceanic species, ranging in Europe from the British Isles to Portugal, with extensions in the Mediterranean region, where it is very rare and probably on the way of extinction. The sample collected on M. Ferru is, to our knowledge, the only collection of this species made in Italy this century.

2 *T. villosus* (Ach.) Norm.

S - Isola di Caprera, on *Juniperus phoenicea*. Leg. Gennari (MOD, BAGLIETTO 1879: 59 as *Physcia villosa*).

The Italian distribution of this species is from Liguria to Sicily; it is most frequent in litoral maquis vegetation (often on *Juniperus*) on the western coast of the peninsula where it not rarely occurs with *Tornabea scutellifera* (NIMIS & SCHIAVON 1986).

162 *Tephromela*

The genus *Tephromela* was re-established by HAFELLNER 1984: 344 primarily on the basis of ascus structure for the complex of *Lecanora atra* (Huds.) Ach. The genus concept was later amplified by HERTEL & RAMBOLD 1985, to include the *Lecidea armeniaca*-complex.

1 *T. atra* (Huds.) Hafellner

Syn.: *Lecanora atra* (Huds.) Ach.

C - Isola dei Cavoli. Leg. NP (GZU, TSB). Giara di Gesturi. Leg. NP (GZU, TSB), W. - M. Sette Fratelli, on granite. Leg. WP. - Capo Pecora. Leg. M. - "Ad rupes saxaque vulgaris in montibus Carbonara

(Gemm.), ad fodinas Montevecchio (Marc.), circum Capoterra et Cagliari (Canepa)". (BAGLIETTO 1879:73, several specimens in MOD).
 N - Bruncu Spina, on acid rock. Leg. NP (TSB). - Arcu Correboi, on schists. Leg. E (GZU, HbWB, TSB), B, M. - M. Arcueri, Leg. M. - M. Arbo. Leg. E (SZU). - S. Pantaleo. Leg. Tretiach (TSB). - Gibba. Leg. Tretiach (TSB).

O - M. Ferru. Leg. W.

S - P.ta Falcone, on schist. Leg. NP (GZU, TSB), W. - Stintino, on phyllitic rock. Leg. B. - M. Limbara. Leg. M. - Calangianus, on granite. Leg. B. - S. Teresa di Gallura. Leg. M. - P.so La Variante. Leg. E (SZU). - M. Russu, on granite. Leg. E (TSB).

The species is widespread and very common in the whole island, from the coasts to the Gennargentu ridge. It grows on horizontal as well as on steeply inclined rock surfaces.

2 T. atra var. calcarea (Jatta) Clauz. et Roux

Syn.: *Lecanora atra* var. *calcarea* Jatta

C - Domus de Maria, on limestone (MAMELI 1920:167). - M. Arcuentu. Leg. E (GZU).

N - M. Albo, on limestone. Leg. NP (GZU, TSB). - Between Cala Gonone and Dorgali. Leg. W. - M. Arcueri. Leg. M.

O - Busachi, on limestone. (MAMELI 1920:167).

It is unclear to us, whether this lichen really merits treatment as a distinct taxon. The main differences from var. *atra* are the very thick, whitish, cretaceous thallus and the association with limestone. It may possibly be an ecotype.

3 T. atra var. corticola (Hepp) Hafellner et Jerzer ined.

C - M. Sette Fratelli. Leg. WP - Arcu Genna Bogai, on *Quercus suber*. Leg. B - Tupa Granella, on *Quercus ilex*. Leg. Tretiach (TSB). - Cagliari Leg. Canepa (MOD. BAGLIETTO 1879:73).

N - M. Arcueri. Leg. E (GZU). - M Arbo. Leg. E (TSB), M. - Seui, on *Prunus*. Leg. Marcucci (BAGLIETTO 1879:73).

S - P.so La Variante. Leg. M - P.ta Falcone, on *Juniperus*. Leg. Pertot (TSB). - Aggius, on *Quercus suber*. Leg. W. - Tavolara, on *Quercus ilex*. Leg. Brizzi (TSB).

4 T. grumosa (Pers.) Hafellner et Roux

S - P.so La Variante. Leg. E (GZU), rev. Hafellner.

The thalli contain, according to an analysis by J. Hafellner, atranorin plus lichesterinic acid.

163 *Thelenella*

1 *T. modesta* (Nyl.) Nyl.

C - Portixeddu, on Acacia. Leg. E (GZU), M. - Scaffa, iuxta Cagliari, on Ceratonia. Leg. Canepa (BAGLIETTO 1879:113, BARBEY 1884: 116) - "Supra corticem Fici caricae ad Giorgino iuxta Cagliari." Leg. Canepa (MOD, with *Rinodina exigua*).

We have not been able to check Baglietto's reference. Although *Thelenella modesta* is known from many localities in the temperate and Mediterranean regions of Europe, it has been very rarely collected this century.

164 *Thelidium*

See the note to the genus *Verrucaria*.

1 *T. pyrenophorum* (Ach.) Mudd.

O - Busachi (surroundings of-) on limestone. (MAMELI 1920:172).

We have not seen the specimen, and therefore we are rather dubious about this identification, at least at the species level.

165 *Thelomma*

1 *T. siliceum* (Fee) Tibell

N - Rio Pardu. Leg. E (GZU).

This rare species (TIBELL 1976:243) was hitherto known only from Portugal, France and Greece.

166 *Thelotrema*

1 *T. lepadinum* (Ach.) Ach.

O - Paulilatino (surroundings of-), on siliceous rock (MAMELI 1920:169).

We have not checked the identification. *Thelotrema lepadinum* is generally a species of smooth-barked boles of broad-leaved trees which has also been rarely found on acid rock (SEAWARD & HITCH 1982:162). Its occurrence in Sardinia, however, cannot be excluded. For more details on this species see SCHAUER 1965: 110 (with distribution map in central Europe).

167 *Thyrea*

1 *T. pulvinata* (Schaer.) Massal. coll.

N - M. Marmu, on subvertical limestone wall. Leg. NP (GZU, TSB).

168 *Toninia*

1 *T. affinis* Vežda in Schedae ad A. Vežda Lich. Sel. Exicc, 29: 985, 1971

C - M. Arcuentu, on Verrucaria sp., very sparse. Leg. E (GZU).

N - M. Arcueri, on Verrucaria. Leg. E (GZU).

Toninia affinis was originally described from Rumania as a parasite of Verrucaria cf. tabacina; since then it has been collected from several different localities throughout Europe, always on species of Verrucaria of the Lithoidea-group.

2 *T. aromatica* (Sm.) Massal.

C - "Ad muros rupesque calcareas Cagliari et in finitimis (Canepa) haud rara in monte Ferru (Marcucci)". (MOD. BAGLIETTO 1879: 97) - M. Arcuentu. Leg. E (GZU). - Buggerru. Leg. E (GZU, TSB), M.

N - M. Albo, on calcareous soil. Leg. NP (TSB). - Seui, on earth. Leg. E (GZU).

S - Grotte di Nettuno. Leg. W.

3 *T. caralitana* Bagl.

C - "In praedio Alcais (Canepa)". (MOD, typus. BAGLIETTO 1879:96, as *Thalloidima vesiculare caralitana*). - Cagliari (COLOSI 1917: 469).

This species is very poorly known.

4 *T. coeruleonigricans* (Lightf.) Th. Fr.

C - "Circum Cagliari et Iglesias (Gennari, Canepa), ad fodinas Montevecchio (Marcucci)". (BAGLIETTO 1879:96, as *Thalloidima vesiculare*).

N - M. Albo, on calcareous soil. Leg. NP (TSB). - Arcu Correboi, on soil. Leg. B. - Between Punta Sorichina and M. Tului, on soil. Leg. B. - Seui, on soil on a wall. Leg. E (HBW, TSB). - Esterzili. Leg. M.

S - Tavolara. Leg. Brizzi (TSB).

As elsewhere, this species is very polymorphic in Sardinia.

5 *T. kolax* Poelt

N - Arcu Correboi, on *Placynthium nigrum* on sandstone. Leg. E (TSB).

6 T. lurida (Bagl. ex Arn.) Oliv.

C - "Super terram et inter muscos latas plagas etiam efformans, in promontorio S. Elia atque in praedio Alcais prope Cagliari (Canepa)". (MOD, holotypus. BAGLIETTO 1879:96-97, as *Thalloidima luridum*, with original diagnosis; duplicate in W: herb. Lojkanum).

7 T. mesoidea (Nyl.) Zahlbr.

C - Capo Pecora. Leg. M.

8 T. multiseptata Anzi

C - Below P.ta Serpeddi'. Leg. NP (GZU,TSB).

9 T. squalida (Schleich.) Massal.

Syn.: *Toninia squarrosa* (Ach.) Th. Fr.

N - Bruncu Spina, on mosses on acid substrate. Leg. NP (GZU,TSB).

10 T. toepfferi (Stein.) Navàs

N - Desulo, on soil among mosses. Leg. NP (GZU,TSB).

This species, easily recognized by its large white pseudocyphellae, was originally described from Madeira. It is a fairly common and characteristic element (often mistaken for *Toninia coeruleonigricans*) in dry open grasslands on loamy soil on the Azores (P.W. James, in litt.), Tenerife and Gran Canaria (several specimens in TSB), from 300 to 1600 m, and is also known from the Iberian peninsula. Our collection comes from its most eastern known locality.

11 T. tristis (Th. Fr.) Th. Fr.

Syn.: *Psora tabacina* auct.

C - "Super terram in apriciis promontorii S. Elia prope Cagliari (Gemm.,Canepa): extat etiam in h. Moris". (MOD. BAGLIETTO 1879:97, as *Thalloidima tabacinum*).

A species with its main distribution centred in the Mediterranean region, with isolated records from Scandinavia; it is also present in the Alps.

12 T. tumidula (Sm.) Zahlbr.

N - M. Albo, on limestone. Leg. NP (GZU,TSB).

Toninia tumidula is a chiefly southern-European species of more or less weathered limestone rocks, also known from the southern Alps, southern central Europe and Britain.

13 T. sp.

C - M. Arcuentu. Leg. E (GZU).

The specimen is parasitic on *Lecanora muralis*.

169 *Tornabea*

1 *T. scutellifera* (With.) Laund.

Syn.: *Anaptychia intricata* (Duf.) Massal., *Tornabea atlantica* (Ach.) Osth., *Tornabeniopsis atlantica* (Ach.) Follm.

N - Orri', on *Quercus ilex* and *Phillyrea*. Leg. Canepa (MOD, W: Herb. Lojka), BAGLIETTO 1879: 60, as *Hagenia intricata*; also cited by TAVARES 1957:50 as *Anaptychia intricata*).

This oceanic species still occurs along the Tyrrhenian coasts of the Italian peninsula, from Tuscany (one recent locality) to south Latium, where it grows on shrubs of coastal low maquis vegetation and is almost always associated with *Teloschistes villosus* (NIMIS & SCHIAVON 1986).

170 *Trapelia*

1 *T. coarctata* (Sm. ex Sowerby) Choisy

S - Aggius. Leg. W.

2 *T. involuta* (Tayl.) Hertel

S - P.so La Variante, on pebbles. Leg. E (GZU, TSB). - M. Limbara, sterile. Leg. E (GZU, TSB).

The two collections under this name probably differ from *Trapelia involuta* as interpreted by COPPINS & JAMES 1984: 225; this is a rather common lichen until now named as *Trapelia coarctata* in central Europe, with small, somewhat effigurate areolae, occurring on weathered stones and small pebbles along waysides, etc. The specimens from Sardinia resemble a lichen that we have also collected in various parts of central Europe which has larger squamules, partly raised from the substratum, and mostly occurs without apothecia. This characteristic entity, so far as we know, has no name. Further fertile collections need to be studied.

171 *Trapeliopsis*

1 *T. flexuosa* (Fr.) Coppins et P.James

Syn.: *Lecidea aeruginosa* Borr.

N - M. Ortobene, on *Pinus*. Leg. NP. (GZU).

S - M. Limbara, on wood. Leg. E (TSB). - P.so La Variante. Leg. M.

Also cited by BAGLIETTO 1879:105, from the herbarium Moris, without indication of locality ("Ad veteres trabes") as *Biatora flexuosa*. SANTESSON 1984, prefers the specific epithet "aeruginosa"; we are not able to solve this nomenclatural problem.

2 *T. granulosa* (Hoffm.) Lumbsch

Syn.: *Lecidea granulosa* (Hoffm.) Ach.

N - M. Limbara, on soil, sterile. Leg. E (GZU, SZU, TSB).

3 *T. wallrothii* (Flk. ex Spreng.) Hertel et Schneider

Syn.: *Lecidea wallrothii* Flk. ex Spreng.

N - Desulo, on soil. Leg. NP (GZU, TSB).

S - M. Limbara, on soil and on moss. Leg. E (GZU, SZU, TSB), M. - Nuraghe Loelle, on soil. Leg. Pertot (TSB).

This is an oceanic species in Europe, ranging from northern Britain to Portugal (and further south to the Canary Islands); it grows on thin, well-drained, weakly acid soil in sunny, exposed situations. According to SEAWARD & HITCH 1982: 164, the species is confined to coastal habitats in western Britain, but in Tenerife it has been collected at 1800 m (specimens in TSB). A recent further record in Italy is from Calabria (TSB).

172 *Trimmatostroma*

1 *T. sp.*

C - M. Arcuentu, on *Lecanora rupicola*. Leg. M.

173 *Umbilicaria*

1 *U. crustulosa* (Ach.) Frey

C - M. Linas, on Vulcanite, 1000 m. Leg. Feige. - Teulada, on granite. Leg. Feige. - Villacidro. Leg. WP.

N - P.ta Paulinu. Leg. NP (GZU, TSB). - Arcu Correboi. Leg. B, E (HbWB, GZU, TSB). - Arcu Correboi (2.5 Km NW of-) on schist. Leg. B - Bruncu Spina, 1200 m. Leg. Feige. - Aggius. Leg. WP. - Monti di Aritzo. 1859. Leg. Gemari (MOD).

S - M. Limbara, on granite, 1000 m. Leg. Feige, E (GZU, TSB). - ibid. Leg. Ceni (Herb. F. Ceni, Brescia). - Capo d' Orso. Leg. E (GZU) - Aggius. Leg. W. - Villacidro, 270-30 m. Leg. W. - P.so La Variante. Leg. E (SZU). - Palau. Leg. Ceni (Herb. F. Ceni, Brescia).

This is an arctic-alpine species whose southernmost known stations in Italy are in Calabria (Aspromonte). The species varies considerably in the form and colour of the thallus, the form of the apothecia and in the degree of their immersion in the thallus. It normally grows on steep rock faces with some seepage tracks. The specimens collected in Sardinia are rather different from those of Central Europe. They have sessile apothecia, a different colour, a smaller size, etc. This aspect is in need of further study. Some of the specimens collected at P.ta Paulinu have a lower surface and spore characters resembling those of *Umbilicaria hirsuta* but are lacking soredia. A specimen of M. Limbara (herb. Ceni, Brescia), with spores more than 25 μ m long, a black lower surface, and apothecia with central umbo and a very thick margin probably belongs to *Umbilicaria spodochroa*. In MOD there is also a specimen without locality, from the herbarium Moris, labelled as *Umbilicaria vellea*.

2 *U. cylindrica* (L.) Del. v. *cylindrica*

N - Arcu Correboi. Leg. E (SZU).

? - "Ad saxa in montibus" Leg. Moris (BAGLIETTO 1879:95). - "Sardin.", from the herbarium Parlatore (RO).

A very polymorphic species with broad circumboreal distribution. Present also in temperate areas of the southern hemisphere (Tasmania, New Zealand). It grows in exposed, not nutrient-rich, sites.

3 *U. cylindrica* v. *tornata* (Ach.) Nyl.

N - P.ta Paulinu. Leg. NP (GZU,TSB).

4 *U. deusta* (L.) Baumg.

N - Bruncu Spina. Leg. NP (TSB).- *ibid.*, 1200 m, on granite. Leg. Feige .

S - M. Limbara, on granite. Leg. E (TSB).

A species with a very wide distribution, frequent on boulders close to the soil surface, within open woodland vegetation, or on rocks with late snow lie and some accumulation of nutrients. The most southern finds in Italy are from Calabria.

5 *U. grisea* (Sw.) Ach.

C - Orri, on granite (BAGLIETTO 1879:95).

N - Rio Madau. Leg.W (GZU). - Forni (2 Km South of -), on granite.

Leg. Feige. - M. Ortobene. Leg. NP (TSB).

The ecology of this species is similar to that of *Umbilicaria hirsuta*; perhaps *Umbilicaria grisea* is more restricted to a suboceanic microclimate. The most southern stations in Italy are from Sicily (M.

Etna).

6 U. hirsuta (Sw.) Ach.

C - M. Linas, on Vulcanite, 1000 m. Leg. Feige.

N - P.ta Paulinu. Leg. NP (GZU,TSB). - Bruncu Spina. Leg. NP (TSB).

- Arcu Correboi. Leg. E (TSB,GZU), B.

A nitrophytic species on subvertical rock faces, often with semi-permanent seepage tracks. See also note on *Umbilicaria crustulosa*.

7 U. nylanderiana (Zahlbr.) H. Magn.

N - P.ta Paulinu. Leg. NP (GZU). - Arcu Correboi. Leg. E (GZU).

A species of nutrient-enriched sites. Considered by SCHADE 1951 as a form (old specimens) of *U. polyphylla*. We are not certain about the taxonomic status of this taxon.

8 U. polyphylla (L.) Hoffm.

N - Bruncu Spina. Leg. NP (GZU,TSB). - Fonni (2 Km South of -), on granite. Leg. Feige. - Arcu Correboi, on gneiss. Leg. E (HbWB, GZU,SZU,TSB),B.

S - M. Limbara, on granite. Leg. E (GZU,SZU). - ibid. Leg. Ceni (Herb. F. Ceni, Brescia).

The ecological requirements of this species are similar to those of *Umbilicaria cylindrica*. Some of the specimens from Bruncu Spina and M. Limbara have a grey upper surface and appear rather similar to *Umbilicaria cinerascens*, however, the hypothalline propagules (thallospores) are 4-6 celled.

9 U. polyrhiza (L.) Ach.

S - M. Limbara, on granite. Leg. E (GZU, TSB), M. - ibid. Leg. Ceni (Herb. F. Ceni, Brescia).

This species is distributed from the boreal (subarctic) zone to the mountains of southern Europe, with a subatlantic tendency. The southernmost find in Italy is from Calabria (Aspromonte). The species occurs in stations with an oceanic climate and long periods of mist.

10 U. spuchtrua (Ehrh. ex Hoffm.) DC.

? - Sardinia (FREY 1936:427).

This oceanic species is recorded from Sardinia and Calabria in the map published by FREY loc. cit.; FREY does not cite any specimen or literature report on which these records are based. It may be that this report derives either from BAGLIETTO 1879: 95 (M. Perdosu, Aritzo) or from COLOSI 1917:463 (Tonara). In both cases we have not been able to check the identifications. See also note on *Umbilicaria crustulosa*.

174 *Usnea*

by Ph. CLERC

Among the macrolichen genera rich in species in the flora of Europe, *Usnea* remains the last one most urgently in need of a modern taxonomic revision. The only existing monograph was produced 50 years ago and is now out of date. Of the nearly 140 European taxa described by MOTYKA (1935-1936), only 9 are reported from Sardinia. This may indicate that either *Usnea* is not well represented in the lichen flora of Sardinia, or that it has been undercollected. The cited specimens have been revised mostly in the course of preliminary studies for a monograph of the European species (CLERC, unpublished). I have not seen the specimens identified by the collectors as *Usnea ceratina* and *Usnea rubicunda*.

1 *U. articulata* Hoffm.

C - M. Maxias. Leg. Tretiach (TSB), I have not seen the specimen.

N - P.ta Palai, on Acer and Quercus pubescens. Leg. NP (GZU, TSB), B.

- M. Arcueri, on Quercus ilex. Leg. E (TSB).

O - M. Ferru. Leg. Feige. I have not seen the specimen.

This species is characterized by its pendulous habit, the more or less inflated segments, the numerous pseudocyphellae, the very thin cortex and the large and lax medulla in the main branches. Fumarprotocetraric acid, $\pm$ protocetraric acid, $\pm$ barbatic acid in the medulla. *Usnea articulata* is one of the most frequent *Usnea*-species in the whole south west European area.

2 *U. ceratina* Ach.

O - M. Ferru. Leg. Feige.

I have not seen this specimen.

3 *U. cf. diploctypus* Vain.

N - P.ta Palai. Leg. NP (GZU).

Usnea diploctypus has been wrongly considered as being exclusively saxicolous. It is characterized by its subpendulous thallus with anisotomic-dichotomous ramifications, minute, tuberculate and richly isidiate soralia, as well as salazinic acid in the medulla. Frequent in the more or less continental areas of Scandinavia and central Europe, this species seems to be rarer in southern and western Europe.

4 *U. filiperdula* agg.

N - P.ta Palai. Leg. NP (GZU, TSB).

This aggregate is represented by several closely related "species" and

requires a detailed taxonomic revision. The thallus is pendulous, the elongated branches being densely and more or less regularly covered with long fibrils (fish-bone appearance). Salazinic acid is present in the medulla. This species is most frequent in central Europe and Scandinavia.

5 **U. glabrata** (Ach.) Vain. ex Mot.

N - P.ta Palai. Leg. NP (GZU).

The shrubby habit, the secondary branches which are constricted at the base, the lack of papillae, the deep excavate soralia and protocetraric acid in the medulla are the typical feature of this small *Usnea*. It is widespread but not frequent in central and northern Europe, rare in southern Europe.

6 **U. rubicunda** Stirt.

O - M. Ferru. Leg. Feige.

I have not seen this specimen.

7 **U. scabrata** agg.

N - M. Arcueri, on *Quercus ilex*. Leg. E (GZU,TSB).- P.ta Palai. Leg. NP (GZU, TSB).

The specimens collected in Sardinia are closely related to the species ordered in the subsection *Scabratae* Mot. by MOTYKA (1935-1936). Comparison with original material shows resemblances especially to *Usnea scabrata* Nyl. and to *Usnea maxima* Mot. This aggregate requires a detailed taxonomical revision.

8 **U. subfloridana** Stirt. s. str.

Syn.: *Usnea comosa* (Ach.) Roehl. nom. illeg.

N - P.ta Palai. Leg. NP (GZU).

This species is the sorediate counterpart of *Usnea florida* (L.) Wigg. em. Clerc and contains either thamnolic or squamatic acids or both in the medulla. The thallus is shrubby to subpendant and the soralia are more or less tuberculate, minute, very dense and always richly isidiate. *Usnea subfloridana* is a very common species in the whole of Europe.

9 **U. wasmuthii** Raes.

Syn.: *Usnea comosa* ssp. *melanopoda* Asah.

N - P.ta Palai. Leg. NP (GZU).

Up to the present time this taxon has been considered as being the salazinic acid and the norstictic, stictic acids chemoraces of *Usnea subfloridana*. *Usnea wasmuthii* is a distinct shrubby to subpendant

species with slightly excavate, large, conspicuous, oblong-cylindrical to irregularly rounded, moderately dense, more or less isidiate soralia. The medulla contains barbatic acid, + salazinic acid (chemorace I) or norstictic and + salazinic acids (chemorace II), or norstictic and stictic acids (chemorace III). It is however not excluded that the three chemoraces are distinct taxa. It is widespread but not frequent in the whole of Europe.

175 *Verrucaria*

We have collected many more samples of Verrucariaceae than those listed below. Many collections are poorly developed or in a moribund state, so that we have not attempted an identification. Anyway, identifications in this notoriously difficult and poorly documented genus can only be intended as provisional.

1 *V. acrotella* Ach.

C - Buggerru, on limestone near the coast. Leg. E (GZU).

N - Arcu Correboi. Leg. M.

2 *V. amphibia* R. Clem.

Syn.: *Verrucaria symbalana* Nyl.

C - Capo Pecora, on rock in the littoral belt. Leg. E (GZU).

For the distribution of this species in southeastern Spain see CASARES & LLIMONA 1984: 213.

3 *V. anziana* Garov.

Syn.: *Polyblastia anziana* (Garov.) Servit

N - Rio Aratu, on periodically inundated rocks. - P.ta Palai. Leg. NP (GZU). - Rio Pardu. Leg. E (GZU).

The collections have been identified by H. Ullrich, partly with "?". All specimens were in creeks, where they are periodically inundated during the humid seasons. During summer, the creeks are dry for several months.

4 *V. aspiciliicola* R. Sant.

Syn.: *Verrucaria aspiciliae* Zehetl., non (Lahm) Stitzenb.

N - M. Arcueri, on *Aspicilia calcarea*. Leg. E (GZU). - M. Albo, on *Aspicilia*. Leg. NP (GZU,TSB).

5 *V. calciseda* DC.

C - Promontorio S. Elia. Leg. Gennari (MOD. BAGLIETTO 1879:115).

- 6 **V. cataleptoides** Nyl.
N - Rio Pardu. Leg. E (GZU).

- 7 **V. ~~csemensis~~** Zschacke cf.
N - P.ta Palai, same ecology of Verrucaria anziana. Leg. NP (GZU). -
Rio Aratu. Leg. NP (GZU).
The specimen has been identified (with "?") by H. Ullrich.

- 8 **V. floerkeana** DT. et S.
N - Rio Pardu. Leg. E (GZU).

- 9 **V. foveolata** (Flk.) Massal
C - "In saxosis calcareis Cagliari (Canepa)". (BAGLIETTO 1879:115;
we did not see the specimen).

- 10 **V. glaucina** Ach. s. lat.
C - Cagliari (BAGLIETTO 1879:114, under V. fuscella glaucina)
We have not seen the specimen, that according to BAGLIETTO, was growing
"super terram calcaream compactam", which would be a rather unusual
substrate for this species).

- 11 **V. macrostoma** Duf. et DC.
C "Super arenarias in rure Comitiss Mossa circum Cagliari (Canepa)".
(BAGLIETTO 1879:114).
We have not seen this specimen. The presence of this species in
Sardinia is very likely.

- 12 **V. ~~sannio~~** (Scop.) Arnold
N - M. Albo, on limestone. Leg. NP (TSB). - Cala Gonone. Leg. B. -
M. Tuttavista. Leg. B.

- 13 **V. muralis** Ach.
C - "Ad saxa calcarea in praedio Alcais et ad Bonaria Cagliari
(Canepa)". (MOD. BAGLIETTO 1879:115).

- 14 **V. ~~mirum~~** (Arnold) Lindau
N - M. Arcueri, on limestone. Leg. E (GZU,TSB).

- 15 **V. ~~nigrescens~~** Pers.
C - "Ad saxa rupesque huc et illuc in montibus circum Orri et prope
Iglesias (Canepa)". (BAGLIETTO 1879:115; we have not seen the
specimens).
N - M. Albo, on limestone. Leg. NP (GZU,TSB).

- 16 **V. poeltiana** Clauzade & Roux 1984: 194 s.lat.
 S - Capo Caccia, on *Caloplaca flavescens*. Leg. NP (GZU,TSB).
 The species was originally described from its host *Caloplaca aurantia*.
 The material from Sardinia seems to be not completely identical with
Verrucaria poeltiana. We refrain from a more detailed analysis of the
 material, since the group of *Verrucarias* that are parasitic on members
 of the *Teloschistaceae* is very numerous, and should be studied from more
 abundant material.
- 17 **V. praenupta** Anzi
 N - Desulo. Leg. NP (GZU).
- 18 **V. sphaerospora** Anzi
 N - Rio Pardu. Leg. E (GZU), Rev. O. Breuss.
 For the distribution of this lichen in southeastern Spain see CASARES &
 LLIMONA 1984:213.
- 19 **V. viridula** (Schrad.) Ach.
 C - "Ad saxa calcarea (*Lumachella*) in parvula insula S. Simone prope
 Cagliari (Canepa)". (BAGLIETTO 1879:114; we have not seen the
 specimen).
- 20 **V. sp.**
 N - M. Arcueri. Leg. E (GZU).
 Thallus endolithic. Perithecia immersed only at the base. Exciple
 black, enclosing the hymenium. Spores globose to very broadly elliptic,
 measuring only 9.5-12 x 7.5-9 μ m.
- 21 **V. sp.**
 N - M. Albo, on *Caloplaca* sp., growing on limestone. Leg. NP (GZU).
 This *Verrucaria* belongs to a group of parasitical species, occurring on
 many crustaceous and placodioid members of the genus *Caloplaca*. Several
 of them have been described by ZEHETLEITNER 1978, but there are
 probably many still undescribed species.

176 *Weddellomyces*

The genus *Weddellomyces* has been quite recently described by D. HAWKSWORTH
 1986 with *Verrucaria epicallospisma* Weddell as type and only species. It
 seems to have no relations with *Phaeospora*, in which it was included
 several decades ago. According to D. HAWKSWORTH op. cit. the species, which

is parasitic on species of the *Caloplaca aurantiaca*-group is known until now only from England, Wales and France.

- 1 ***W. epicallopisma*** ("epicallopismum") (Weddell) D. Hawksw.
N - M. Arcueri, on *Caloplaca flavescens*. Leg. E (GZU).

177 *Xanthopsorella*

- 1 ***X. ilimona*** H. Hertel, J. M. Egea & J. Poelt spec. nov.
Typus: Hispania, Prov. Murcia, Sierra de Enmedio, Puerto Lumbreras, 500 m, 105° S. Overhanging hard limeless schists, with *Peltula euploca*, on track-lines. 8.8.1978. Leg. J.M. Egea no. 628 (Herb. EGEA: Holotypus, M: Isotypus).
Thallus subpeltatus peltatusve, pallide olivacei-cervinus, K-, C-, KC-, J-. Squamae ad 15 mm in diam., sed saepe multo minores. Apothecia ± marginalia, nigra, emarginata, convexa, usque ad 1.8 mm in diam. Hymenium 45-65 µm altum, superne viridi-nigrum. Hypothecium incoloratum. Paraphyses simplices apicem versus non incrassatae. Sporae ellipsoideae ad subglobosae, 7-9.5-11 x 4- 5.5-6.0-7.5 µm.
This remarkable new lichens will be discussed in a forthcoming paper by EGEA and HERTEL. The species is also known from the Province of Zaragoza in Spain, where it was collected by A. CRESPO & J. POELT, and Sardinia (see below). In the material at GZU it can be seen that the thalli of this new lichen start their development on the surface of thalli of *Peltula euploca*, which later on are completely overgrown. It is possible that also other Cyanophili could serve as hosts, but this must be studied on a richer material. We collected the species in the following locality:
N - Torre Argentina. Leg. NP (GZU, TSB).

178 *Xanthoria*

- 1 ***X. calcicola*** Oxner
Syn.: *Xanthoria aureola* auct.
C - Giara di Gesturi. Leg. W. - Costa Verde. Leg. B. - Isola dei Cavoli. Leg. NP (TSB). - Capo Pecora. Leg. E (HbWB, GZU, TSB), M. - M. Arcuentu. Leg. E (SZU), M. - "circum Cagliari, Iglesias, Orri et Capoterra (Genn., Canepa), in insulis Toro et Serpentara (Gestro)" (BAGLIETTO 1879:60). - S. Antioco. Leg. Brizzi (TSB).
N - Torre Argentina. Leg. NP (TSB). - Tonara (COLOSI 1917: 465).
S - Stagno di Pilo. Leg. W. - Stintino. Leg. B. - Altopiano di

Campeda, on basaltic rock. Leg. B. - M. Russu, on rocks near the coast. Leg. E (SZU, TSB). - Torralba. Leg. M. - S. Teresa di Gallura. Leg. M. - P.ta Falcone. Leg. NP (GZU). - Tavolara. Leg. Brizzi (TSB). - Alghero. Leg. Pertot (TSB).

As in other parts of the Mediterranean region this species is rather common but very variable.

2 **X. candelaria** (L.) Th.Fr.

N - P.ta Palai. Leg. NP (GZU, TSB).

3 **X. isidioidea** (Beltr.) Reichert et Galun

C - Below P.ta Serpeddi'. Leg. NP (TSB).

N - M. Russu, near the coast, with *X. calcicola*. Leg. E (TSB).

The taxon is not well known and may comprise several entities.

4 **X. parietina** (L.) Th.Fr.

C - Las Plassas near Barumini, on *Opuntia*. Leg. B. - M. Arcuentu. Leg. M (GZU). - Portixeddu. Leg. E (SZU, TSB), M.

N - M. Ortobene, on *Populus*. Leg. NP (TSB). - Bidicolai, on *Genista aetnensis*. Leg. B. - Arcu Correboi (2.5 Km NW of-), on *Quercus pubescens*. Leg. B. - Arcu Correboi. Leg. E (SZU). - Seui, on *Ulmus*. Leg. E (TSB), M. - Tonara (COLOSI 1917:465).

O - Stagno di Cabras, on *Opuntia*. Leg. B.

S - P.ta Falcone, on *Juniperus*. Leg. NP (TSB). - Mara, on *Quercus*. Leg. B. - Altopiano di Campeda, on *Ulmus*. Leg. B. - SS. Trinita' di Saccargia, on *Prunus*. Leg. E (TSB). - P.so La Variante. Leg. E (SZU). - Tavolara, on twigs. Leg. Brizzi (TSB).

A common species throughout the island; we also saw it in many more localities. Also cited by BAGLIETTO 1879: 60 as "ubique frequens ad truncos ramulosque arborum et fruticum, ad trabes et parietes ligneas".

5 **X. parietina** (L.) Th. Fr. subsp. **ectanea** (Ach.) Clauz. et Roux

C - "Ad scopulos maritimos in promontorio S. Elia apud Cagliari (Canepa)" (BAGLIETTO 1879:60, as *Physcia parietina ectanea*).

This taxon is not yet clear to us.

6 **X. polycarpa** (Hoffm.) Rieber

N - S' Arcu de Tascussi, on *Alnus*. Leg. NP (TSB). - P.ta Palai, on twigs. Leg. Pertot (TSB).

S - P.so La Variante. Leg. E (SZU).

The record cited by COLOSI 1917: 465 from Tonara on schist as *Xanthoria parietina* var. *polycarpa*, is probably based on an error of identification since *Xanthoria polycarpa* is normally epiphytic.

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Appendix 1

List of synonyms

Acarospora massiliensis (Harm.) H. Magn. = *A. lavicola*
Acarospora silesiaca H. Magn. = *Polysporina lapponica*
Alectoria minuscula (Nyl.) Degel. = *Pseudephebe minuscula*
Alectoria pubescens (L.) R. Howe = *Pseudephebe pubescens*
Anaptychia fusca (Huds.) Vain. = *A. runcinata*
Anaptychia intricata (Duf.) Massal. = *Tomabea scutellifera*
Arthopyrenia glebarum Arnold = *Stignidium glebarum*
Aspicilia cinerea g) *rubicunda* Bagl. = *A. cupreoglaucia*
Astroplaca opaca (Fr.) Bagl. = *Placolecis opaca*
Bacidia luteola (Ach.) Mudd = *B. rubella*
Bacidia hypnophila (Turner) Zahlbr. = *Mycobilimbia sabuletorum*
Bacidia muscorum (Ach.) Mudd = *Bacidia bagliettoana*
Biatorina inundata Hepp ex Koerb. = *Lecania inundata*
Bilimbia acclinis (Flot.) Zahlbr. = *Bacidia populorum*
Buellia canescens (Dicks.) Massal. = *Diploicia canescens*
Buellia leptoclinoides (Nyl.) Steiner = *Hafellia leptoclinoides*
Buellia margaritacea auct. = *B. nivalis*
Buellia subcanescens R.G. Werner = *Diploicia subcanescens*
Buellia tumida (Massal.) Bagl. = *B. dispersa*
Caloplaca aurantiaca auct. p.p. = *C. flavorubescens*
Caloplaca festiva (Ach.) Zw. = *C. crenularia*
Caloplaca heppiana (Muell.Arg.) Zahlbr. = *C. flavescens*
Caloplaca lactea f. *fulva* (Harm.) Zahlbr. = *C. marmorata*
Caloplaca lactea f. *rubra* (B.de Lesd.) Zahlbr. = *C. marmorata*
Caloplaca lallavei (Clem.) Flag. = *C. erythrocarpa*
Caloplaca subbracteata (Nyl.) Lett. = *Fulgensia subbracteata*
Caloplaca xantholyta (Nyl.) Jatta = *Leproplaca xantholyta*
Catillaria olivacea Fr. = *Solenopsora olivacea*
Celidium stictarum Tul. = *Plectocarpon lichenum*
Cetraria glauca (L.) Ach. = *Platismatia glauca*
Chrysopsora testacea (Hoffm.) Choisy = *Psora testacea*
Cladonia anomaea (Ach.) Ahti et P.James = *C. ramulosa*
Cladonia verticillata (Hoffm.) Schaer. s.lat. = *C. cervicornis* s. lat.
Cladonia conista (Nyl.) Robbins = *C. humilis*
Cladonia nylanderii P.Cout. = *C. firma*
Collema auriculatum Hoffm. = *C. auriforme*
Collema subfurvum (Muell.Arg.) Degel. = *C. subflaccidum*
Collema tuniforme (Ach.) Ach. = *C. fuscovirens*
Coscinacladium occidentale Kunze = *Lecanora lisbonensis*
Cyphelium zahlbruckneri G. Samp. = *C. lecideinum*
Dermatocarpon bucekii Nadv. et Serv. = *Placopyrenium bucekii*

Dermatocarpon hepaticum auct. = *Catapyrenium squamulosum*
Dermatocarpon weberi (Ach.) Mann = *D. luridum*
Diploschistes bryophilus (Ehrh.) Zahlbr. = *D. muscorum*
Diplotomma alboatrum (Hoffm.) Flot. = *Buellia alboatra*
Dirina repanda auct. = *D. massiliensis*
Endopyrenium trachyticum Haszl. = *Placopyrenium trachyticum*
Flavoparmelia caperata (L.) Hale = *Parmelia caperata*
Gyalolechia cinnabarina Flagey = *Caloplaca marmorata*
Gyalolechia lactea f. *rubra* B. de Lesd. = *Caloplaca marmorata*
Haplocarpon platycarpoides (Bagl.) Hertel = *Porpidia platycarpoides*
Heppia euploca (Ach.) Vain. = *Peltula euploca*
Huilia crustulata (Ach.) Hertel = *Porpidia crustulata*
Huilia macrocarpa (DC.) Hertel = *Porpidia macrocarpa*
Huilia platycarpoides (Bagl.) Hertel = *Porpidia platycarpoides*
Huilia tuberculosa (Sm.) P. James = *Porpidia tuberculosa*
Hypogymnia atrofusca (Schaer.) Raes. = *Brodoa atrofusca*
Hypogymnia intestiniformis (Vill.) Raes. = *Brodoa intestiniformis*
Lecanactis stenhammari (Fr.) Am. = *Dirina stenhammari*
Lecania erysibe v. *inundata* (Hepp. ex Koerb.) Zahlbr. = *L. inundata*
Lecania erysibe f. *umbratica* (Arnold) Zahlbr. = *L. sylvestris* v. *umbratica*
Lecanora albescens v. *bandolensis* (B. de Lesd.) Clauz. & Roux = *L. bandolensis*
Lecanora alphoplaca Ach. = *Aspicilia alphoplaca*
Lecanora atra (Huds.) Ach. = *Tephromela atra*
Lecanora atra v. *calcarea* Jatta = *Tephromela atra* v. *calcarea*
Lecanora badia (Pers.) Ach. = *Protoparmelia badia*
Lecanora cartilaginea (Westr.) Ach. = *L. achariana*
Lecanora cinerea v. *rubicunda* (Bagl.) Zahlbr. = *Aspicilia cupreoglauca*
Lecanora fuscopallens (Krempelh.) Zahlbr. = *Protoparmelia montagnei*
Lecanora lactea f. *fulva* Harm. = *Caloplaca marmorata*
Lecanora laevis Poelt = *L. sienae*
Lecanora praepostera auct. = *L. schistina*
Lecanora psarophana Nyl. = *Protoparmelia montagnei*
Lecanora rufofusca Maheu et Gillet = *Protoparmelia montagnei*
Lecanora sardoa Bagl. = *L. schistina* (?)
Lecanora similis (Massal.) Nyl. = *Hymenelia similis*
Lecanora stenospora Hue = *Protoparmelia montagnei*
Lecanora zonata Bagl. = *Protoparmelia montagnei*
Lecidea achristotera Nyl. = *Lecidella achristotera*
Lecidea aeruginosa Borr. = *Trapeliopsis flexuosa*
Lecidea chondrodes (Massal.) Malbr. = *Clauzadea chondrodes*
Lecidea fuscorubens Nyl. = *Clauzadea monticola*
Lecidea goniophila auct. = *Lecidella anomaloides*
Lecidea granulosa (Hoffm.) Ach. = *Trapeliopsis granulosa*
Lecidea hypnorum Libert = *Mycobilimbia hypnorum*
Lecidea immersa (Hoffm.) Ach. = *Clauzadea immersa*

Lecidea insularis Nyl. = *Rimularia insularis*
Lecidea latypea auct. = *Lecidella carpathica*
Lecidea latypiza Nyl. = *Lecidella carpathica*
Lecidea lucida (Ach.) Ach. = *Psilolechia lucida*
Lecidea olivacea (Hoffm.) Massal. = *Lecidella elaeochroma*
Lecidea opaca Fr. = *Placolecis opaca*
Lecidea parasema (Ach.) Ach. p.p. = *Lecidella elaeochroma*
Lecidea petraeoides Nyl. = *Protoparmelia petraeoides*
Lecidea protrusa auct. = *Lecidella scabra*
Lecidea querneae (Dicks.) Ach. = *Pyrrhospora querneae*
Lecidea solediza Nyl. = *Porpidia tuberculosa*
Lecidea speirea (Ach.) Ach. = *Porpidia speirea*
Lecidea tenebrosa Flot. = *Schaereria tenebrosa*
Lecidea tumida Massal. = *Porpidia tuberculosa*
Lecidea umbrosa (Bagl. et Massal.) Hertel = *Lecidella anomaloides*
Lecidea vulgata Zahlbr. = *Lecidella stigmatia*
Lecidea wallrothii (Flk.) Hertel et Schneider = *Trapeliopsis wallrothii*
Leciographa plumbina Anzi = *Bacidia plumbina*
Leptogium palmatum (Huds.) Mont. = *L. corniculatum*
Leptogium scotinum (Ach.) Fr. = *L. gelatinosum*
Leptogium sinuatum (Huds.) Massal. = *L. gelatinosum*
Lichenomyces lichenum (Sommerf.) R. Sant. = *Plectocarpon lichenum*
Lobaria laetevirens (Lightf.) Zahlbr. = *L. virens*
Melanelia acetabulum (Neck.) Essl. = *Parmelia acetabulum*
Melanelia elegantula (Zahlbr.) Essl. = *Parmelia elegantula*
Melanelia exasperata (Ach.) Essl. = *Parmelia exasperata*
Melanelia exasperatula (Nyl.) Essl. = *Parmelia exasperatula*
Melanelia glabra (Schaer.) Essl. = *Parmelia glabra*
Melanelia glabratula (Lam) Essl. = *Parmelia glabratula*
Melanelia laciniatula (Flag.) Essl. = *Parmelia laciniatula*
Melanelia stygia (L.) Essl. = *Parmelia stygia*
Melanelia subaurifera (Nyl.) Essl. = *Parmelia subaurifera*
Melaspilea opegraphoides Bagl. = *M. bagliettoana*
Neofuscelia delisei (Nyl.) Essl. = *Parmelia pulla* v. *delisei*
Neofuscelia glabrans (Nyl.) Essl. = *Parmelia pulla* ssp. *glabrans*
Neofuscelia loxodes (Nyl.) Essl. = *Parmelia loxodes*
Neofuscelia luteinotata (Steiner) Essl. = *Parmelia luteinotata*
Neofuscelia pulla Ach. = *Parmelia pulla*
Neofuscelia verruculifera (Nyl.) Essl. = *Parmelia verruculifera*
Nephroma lusitanicum Schaer. = *Nephroma laevigatum*
Opegrapha granulosa Duf. = *Lecanactis granulosa*
Pannaria microphylla (Sw.) Del. = *P. leucophaea*
Pannaria microsticta auct. = *P. mediterranea*
Pannaria nebulosa (Hoffm.) Nyl. = *Moelleropsis nebulosa*
Pannaria servitiana Gyeln. = *P. ignobilis*

Parmelia aspera Massal. = *P. exasperata*
Parmelia aspidota (Ach.) Poetsch = *P. exasperata*
Parmelia atrofusca (Schaer.) Crombie = *Brodoa atrofusca*
Parmelia encausta (Sm.) Ach. = *Brodoa intestiniformis*
Parmelia glomellifera (Nyl.) Nyl. = *P. verruculifera*
Parmelia isidiotyla Nyl. = *P. loxodes*
Parmelia minuscula (Nyl.) Nyl. = *Pseudephebe minuscula*
Parmelia perlata (Huds.) Ach. = *Parmotrema chinense*
Parmelia pubescens (L.) Choisy = *Pseudephebe pubescens*
Parmelia reticulata Tayl. = *Parmotrema reticulatum*
Parmelia scortea Ach. = *Parmelia tiliacea*
Parmelia trichotera Hue = *Parmotrema chinense*
Parmelina carporrhizans (Tayl.) Poelt et Vežda = *Parmelia carporrhizans*
Parmelina pastillifera (Harm.) Hale = *Parmelia pastillifera*
Parmelina quercina (Willd.) Hale = *Parmelia quercina*
Parmelina tiliacea (Hoffm.) Hale = *Parmelia tiliacea*
Parmotrema perlatum (Huds.) Hale = *Parmotrema chinense*
Peltigera scutata (Dicks.) Duby = *P. collina*
Peltigera spuria (Ach.) DC. = *P. didactyla*
Peltula guepinii (Del.) Gyeln. = *Peltula euploca*
Pertusaria leucosora auct., non Nyl. = *P. dealbescens*
Pertusaria lutescens (Hoffm.) Lamy = *P. flavida*
Pertusaria wulfenii DC. = *P. hymenaea*
Phaeospora epicallopisma (Wedd.) Arn. = *Weddellomyces epicallopisma*
Physcia aipolia ssp. *scopulorum* Lamb. et Vežda = *P. scopulorum*
Physcia albonigra (Schleich.) DT. et S. = *P. albinea*
Physcia elaeina auct. = *Hyperphyscia adglutinata*
Physcia enteroxanthella (Harm.) Oliv. = *Physconia enteroxantha*
Physcia leptalea (Ach.) DC. = *P. semipinnata*
Physcia rondoniana Clauz. et Vežda = *P. biziana* v. *leptophylla*
Physcia teretiuscula (Ach.) Lynge = *P. dubia*
Physcia pusilla Mereschk. = *P. pusilloides*
Physciopsis adglutinata (Flk.) Choisy = *Hyperphyscia adglutinata*
Physconia farrea (Ach.) Poelt = *P. perisidiosa*
Physconia pulverulacea Moberg = *P. distorta*
Physconia pulverulenta (Schreb.) Poelt = *P. distorta*
Pinacisca similis Massal. = *Hymenelia similis*
Placidiopsis circinata Bagl. = *Placidiopsis cinerascens*
Placidium adami borosi Szat. = *Catapyrenium adami-borosi*
Placodiella olivacea (Fr.) Szat. = *Solenopsora olivacea*
Placidium fuscopallens Krempelh. = *Protoparmelia montagnei*
Polyblastia anziana (Garov.) Servit = *Verrucaria anziana*
Polyblastia terricola Bagl. = *Staurothele terricola*
Polychidium albociliatum (Desm.) Zahlbr. = *Leptochidium albociliatum*
Polychidium gemarii Bagl. = *Leptochidium albociliatum*

Appendix 2

Alphabetical list of main localities cited in the text

The number assigned to each locality is reported on the map of Fig. 9. For the localities cited by BAGLIETTO (1879) the elevation is that of the named settlement, which probably does not correspond to the elevation of the actual collecting site.

- 1 **Aggius** - Prov. Sassari. Western part of the village of Aggius, 580 m. 27.4.1979. Leg. WP.
- 2 **Altopiano di Campeda** - Prov. Sassari, 2.5 Km south of Bonorva, close to the Cappella di S. Simeone, basalt, 650 m. 2.5.1980. Leg. B.
- 3 **Anghelu Ruju** - Prov. Sassari. (Necropolis of -). 15 m. Leg. W. - Ibid. Leg. M. Pertot' 4.1987.
- 4 **Arcu Correboi** - Prov. Nuoro. Road Lanusei-Nuoro. Pass of Arcu Correboi, below M. Amario; schist, open Quercus pubescens stand 1235-1300 m., 5.5.1986. Leg. E. - Same locality, also on calcareous rock, Leg. W, B (7.5.1980).
- 5 **Arcu Correboi (2.5 Km NW of-)** - Prov. Nuoro. Gennargentu Mts., 2.5 Km northwest of Arcu Correboi and towards Passo di Caravai on the road 389, 1120-1200 m, on Quercus pubescens and schist. 7.5.1980. Leg. B.
- 6 **Arcu Genna Bogai** - Prov. Cagliari. 7 Km NNW of Iglesias, Arcu Genna Bogai, road 126, 550-560 m. 1.5.1980. Leg. B.
- 7 **Aritzo** - Prov. Nuoro. Wayside trees in the outskirts of the village, 796 m. 20.7.1985. Leg. NP. Collections from Aritzo (Arizzo) by Gennari, and Moris probably at higher elevation ("in montibus Arizzo" "in sylvis Arizzo" BAGLIETTO 1879).
- 8 **Assemini** - Prov. Cagliari. 13 Km from Cagliari. 8 m. Leg. Gennari (BAGLIETTO 1879).
- 9 **Badde Orca** - Prov. Nuoro. Western coast. Badde Orca, road to M. Pittada, north of Bosa, ca. 600 m. 4.1987. Leg. M. Pertot.
- 10 **Badesi Mare** - Prov. Sassari. Northern coast. Badesi Mare, on the road Castelsardo-S. Teresa di Gallura (road 200). Litoral sand dunes with low macchia dominated by Juniperus phoenicea. 0-3 m. 6.5.1986. Leg. E.
- 11 **Baia Chia** - Prov. Cagliari. 12 Km west of Baia Chia along the coast, close to Sa Perda Longa. Calcareous sandstone. 5 m. 18-7-1985. Leg. NP.
- 12 **Barumini** - Prov. Cagliari. Nuraghe Su Nuraxi. Wall of calcareous stones, isolated fruit-trees. ca. 150 m. 20.7.1985. Leg. NP.
- 13 **Below P.ta Serpeddi'** - Prov. Cagliari, road between Burcei and P.ta Serpeddi', outcrops of siliceous rocks, ca. 670 m, 19.7.1985. Leg. NP.
- 14 **Bidicolai** - Prov. Nuoro. Road Dorgali-Tortoli (Nr. 125), Cantoniera Bidicolai, north of P. Scala Manna, west-facing steep granitic rocks, ca. 1000 m. 6.5.1980. Leg. B.

- 15 **Bosa** - Prov. Nuoro. Hills and valley northwest of the village of Bosa, 5-65 m, liparitic rock. Also coast south of Bosa Marina, slopes at the northwestern side of M. Furru, 15-25. 28.3.1983. Leg. B.
- 16 **Bruncu Spina** - Prov. Nuoro. Gennargentu Mts. Trail (on foot) from S'Arcu de Tascussi to Bruncu Spina, metamorphic rocks (mainly schist), 1500-1800 m. 21.7.1985. Leg. NP.
- 17 **Budduso'** - Prov. Sassari. 700 m Quercus suber stands. Leg. A. Satta (COLOSI 1917).
- 18 **Buggerru** - Prov. Cagliari. Western coast. ca. 1.5 Km north of Buggerru, hard metalliferous limestone rocks along the coast. 30-50 m 2.5.1986. Leg. E.
- 19 **Busachi** - Prov. Oristano. 379 m. (MAMELI 1920).
- 20 **Cagliari** - In BAGLIETTO (1879) there are several reports of lichens collected within the present limits of the town; sometimes he specifies the exact location, and then this is reported in the text of this book. The main localities within, or very close to, Cagliari are: Ponte Scaffa, Botanical Garden, Isola di S. Simone, Anfiteatro Romano, S. Bartolomeo, Giorgino, Alcais. The specimens cited by COLOSI (1917) were mostly collected in the Botanical Garden; other localities in which Colosi collected lichens are: Manicomio di Villa Clara and Monte S. Michele.
- 21 **Cala Gonone** - Prov. Nuoro. 2 Km southwest of cala Gonone (Km.3.2 of the road to Dorgali), limestone, ca. 220-245 m. 6.5.1980. Leg. B.
- 22 **Capo d' Orso** (Capo Orso) - Prov. Sassari. Northeastern Coast. Capo d' Orso, east of Palau, granite along the coast, isolated specimens of Quercus ilex and low macchia. 60-109 m. 6.5.1986. Leg. E.
- 23 **Capo Caccia** - Prov. Sassari, west Coast. Capo Caccia, just below the light-tower, ca. 120 m, limestone. 23.7.1985. Leg. NP. - Same locality, above Tramariglio. 4.1987. Leg. Pertot.
- 24 **Capo Malfatano** - Prov. Cagliari. Southwestern coast. Leg. Feige.
- 25 **Capo Mannu** - Prov. Oristano. Capo Mannu, in the western and southwestern outskirts of Su Pallosu 0-60 m (4.5.1980), and between Capo Mannu and Torre di Capo Mannu 0-53 m. (31.3.1983) Leg. B.
- 26 **Capo Pecora** - Prov. Cagliari, west coast. Capo Pecora, northwest of Portixeddu, 0-30 m, granite. 2.5.1986. Leg. E.
- **Capo Sandalo** - see Isola di S. Pietro.
- 27 **Capo S. Elia** - Prov. Cagliari. Capo (Promontorio, Monte) S. Elia, 0-138 m, limestone. Now included within the limits of the city of Cagliari. Citations in BAGLIETTO (1879).
- 28 **Capoterra** - Prov. Cagliari. 54 m. Leg. Canepa "in montibus Capoterra", probably at a much higher elevation. (BAGLIETTO 1879).
- 29 **Caprera** - Prov. Sassari. Arcipelago della Maddalena. Isola di Caprera. Max. elevation 212 m. Collections by Gestro (DE NOTARIS 1846,

- BAGLIETTO 1879), and by Pasquale and Pedicino (JATTA 1874-1886).
- 30 **Carbonia** - Prov. Cagliari. 1 Km ENE of Barbusi, 4 Km N of Carbonia, northern slopes, ca. 170 m. 3.5.1980. Leg. WP.
- **Ciri Foddi** - see S. Lucia.
- 31 **Costa Verde** - Prov. Cagliari, Costa Verde, west of Guspini, north of the mouth of Rio Piscinas, 20-30 m. 1.5.1980. Leg. B.
- 32 **Cuglieri** - Prov. Oristano. Cultivations of olive-trees, ca 400 m. Leg. Colosi (COLOSI 1917). - also: 7 Km ESE of Cuglieri, ca. 750 m. 5.5.1980. Leg. WP.
- 33 **Decimomannu** - Prov. Cagliari. 12 m. Leg. Canepa (BAGLIETTO 1879).
- 34 **Desulo** - Prov. Nuoro, ca. 4 Km from Desulo on the Road to Aritzo, metamorphic rocks, south-facing slope, ca. 950. 20.7.1985. Leg. NP.
- 35 **Domusnovas** (Domus Novas) - Prov. Cagliari. 152 m. Leg. Canepa (BAGLIETTO 1879).
- 36 **Esterzili** - Prov. Nuoro. Barbagia Seulo, ca. 2.5 Km south of the train station of Esterzili, southwest of Seui, ca. 670-80 m; limestone, isolated Quercus ilex plants. Leg. E.
- **Flumini-Bina** - see Orri.
- 37 **Gennari** - Prov. Cagliari. 415 m. Leg. Gennari (BAGLIETTO 1879).
- **Gennargentu** - Prov. Nuoro. Several lichens from the Moris herbarium, without any detailed indication of locality. (BAGLIETTO 1879).
- 38 **Giara di Gesturi** - Prov. Cagliari. Giara di Gesturi, just above the village of Barumini, south-facing basaltic rocks at the margins of the plateau, open Quercus suber stand, ca. 500 m. 20.7.1985. Leg. NP.
- 39 **Gonnosfanadiga** (Gonnos Fernadiga) - Prov. Cagliari. 185 m. Leg. Marcucci (BAGLIETTO 1879).
- 40 **Grotta Su Mammuri** - Prov. Nuoro. Limestone rocks close to Grotta su Mammuri, ca. 1 Km west of Ulassai, 900 m. 5.6.1985. Leg. B.
- **Grotte di Nettuno** - see Capo Caccia.
- 41 **Iglesias** - Prov. Cagliari, 176 m, Leg. Gennari; collections by Canepa in Valle Canonica, probably at a somewhat higher altitude. (BAGLIETTO 1879).
- **Iacco** - see Seui.
- 42 **Isili** - Prov. Nuoro. Gennargentu Mts., close to the Fiume Mannu, ca. 600 m, schists, deciduous Quercus-stands. Leg. Colosi (COLOSI 1917).
- 43 **Is Pauceris** - Prov. Cagliari. Valley of the Rio Giutturu Mannu on the road between Capoterra and Santadi, several stations around Is Pauceris. 170-250 m, hard metamorphic rocks, open Quercus suber stand. 18.7.1985. Leg. NP.
- 44 **Isola dei Cavoli** - Prov. Cagliari, south of Capo Carbonara, Isola dei Cavoli. Granite, 10-20 m. 17.7.1985. Leg. NP.
- **Isola di Caprera** - See Caprera.
- 45 **Isola di S. Antioco** - Prov. Cagliari. Isola di S. Antioco. Eastern

- slopes of M. Arbus, gulf of Torre Canai on the road to Capo Sperone. 1983. Leg. Feige. - Capo Sperone. Summer 1986. Leg. G. Brizzi.
- 46 **Isola di S. Pietro** - Prov. Cagliari, Isola di S. Pietro, Capo Sandalo, south of the light-tower, on trachytic rock. 1983. Leg. Feige.
- **Isola di S. Simeone** - see Cagliari.
- 47 **Lago di Baratz** - Prov. Sassari, 15 m. 4.1987. Leg. M. Pertot.
- 48 **Lanusei** - Prov. Nuoro. Lanusei. Surroundings of the Hotel "Villa Selene", granite, open Quercus- woodland, walls. ca 600 m. 4.5.1986. Leg. E. Collections from Lanusei by Marcucci (BAGLIETTO 1879).
- 49 **Macomer** - Prov. Nuoro. 563 m. Leg. Marcucci "ad basaltes circum Macomer" (BAGLIETTO 1879).
- 50 **M. Albo** - Prov. Nuoro. M. Albo, P.ta Cupetti, south of cantoniera di S. Anna, 900-1000 m, limestone. 25.7.1985. Leg. NP. - M. Albo loc. fonte Usurtia 960 m. 4.1987. Leg. Pertot.
- 51 **Mara** - Prov. Sassari. Mara, 2.5 Km NW of Pozzomaggiore, valley of Rio Mulino, northwest of Mara, 280 m., and valley of Rio Tucanu, 0.5-1 Km north of the cemetery, 250-300 m. 2.5.1980. Leg. B.
- 52 **M. Arbo** - Prov. Nuoro. Barbagia Seulo. Foresta Demaniale di M. Arbo, north of Ussassai, close to the Stazione Forestale. Closed Quercus ilex forest with Carpinus betulus, along a creek, open Quercus pubescens stand, siliceous rocks. 950-1100 m. 4.5.1986. Leg. E.
- 53 **M. Arcuentu** - Prov. Cagliari. Arburese, lower slopes of M. Arcuentu along the road Montevecchio-Marina di Arbus (Costa Verde), NW of Guspini, hard metamorphic rocks, ca 320-380 m. 1.5.1986. Leg. E.
- 54 **M. Arcueri** - Prov. Nuoro. Barbagia Seulo, road Seui-Lanusei, just above Cantoniera Arcueri at the beginning of the road to Genna e Medan. Limestone, closed Quercus ilex forest, schists. 950-1080 m. 3.5.198. Leg. E.
- 55 **M. della Neula** - Prov. Sassari. Southern slopes of Monti della Neula, along the Strada Statale Sarda, between Telti and Calangianus, ca. 1.3 km east of Cantoniera Taroni, 350-415 m. 27.3.1983. Leg. B.
- 56 **M. Ferru** - Prov. Oristano, Monte Ferru, road from Seneghe to Fatt. Pilli, Nuraghe Ruiu, ca. 600 m. 1983. Leg. Feige. - Also northwestern slopes of Monte Ferru, ESE of Cuglieri along the road to S. Lussurgiu, ca. 600 m. 2.5.1980. Leg. B.
- 57 **M. Limbara** - Prov. Sassari. Monte Limbara, southeast of Tempio Pausania, granite, Pinus plantations, Juniperus-stands in wind-swept ridges. 1250-1300 m. 7.5.1986. Leg. E. - ibid. P.ta Balestrieri. 4.1987. Leg. Pertot. Also a few specimens collected by Marcucci (BAGLIETTO 1879).
- 58 **M. Mannu** - Prov. Nuoro. West Coast. Road Bosa-Alghero. M. Mannu: steep southwest-facing calcareous and siliceous rocks along the road. ca. 250 m. 22.7.1985. Leg. NP.

- 59 **M. Maxias** - Prov. Cagliari. Road Capoterra-Santadi, summit of M. Maxias ca 1050 m.; in the same area also the localities of Tupa Granella, Cervi and Rio Alino, 500-700 m. 5.1987. Leg. Tretiach.
- 60 **Monastir** - Prov. Cagliari 83 m. Leg. De Notaris. (BAGLIETTO 1879).
- 61 **Montevecchio** - Cagliari, 7 Km from Arbus, 370 m. Leg. Marcucci. (BAGLIETTO 1879).
- 62 **M. Ortobene** - Prov. Nuoro. Below the summit of M. Ortobene, close to the road. Pinus-stand, granite. 800 m. 25.7.1985. Leg. NP. - ibid. 4.1987. Leg. M. Pertot.
- 63 **M. Santo Pula** (M. Santo di Pula) - Prov. Cagliari, north of the village of Pula. Leg. Moris, Gennari (BAGLIETTO 1879).
- **M. S. Elia** - see Capo S. Elia.
- 64 **M. Sette Fratelli** - Prov. Cagliari. Monte Sette Fratelli, 2.5 Km SE of Arcu Neriddu, Quercus ilex wood close to the road 125, ca. 500 m. Leg. WP. 24.4.1979.- Also 2.5 Km NNW of Monte Arbu, highest point of the road, granite, ca. 600 m. 24.4.1979. Leg. WP. - same locality without any specification. Leg. Gennari, Canepa (BAGLIETTO 1879).
- 65 **M. Tului** - Prov. Nuoro. Mountains south of Dorgali, northeastern slopes of M. Tului, ca. 2-3 Km southwest of Cala Gonone, limestone. 200-400 m. 5.4.1983. Leg. B.
- 66 **M. Tuttavista** - Prov. Nuoro. M. Tuttavista. Road from Orosei to Dorgali, Km. 5.5, 3.5 Km from Orosei, 150 m. 8.5.1980. Leg. B.
- 67 **Nora** - Prov. Cagliari. Archeological Park of Nora, low rocks (granite) near the coast outside the excavations, ca. 5 m, 18.7.1985. Leg. NP.
- 68 **Nuoro** - Prov. Nuoro, 6 Km ESE of Nuoro on the road to Orosei (Km. 9), close to Casa Cantoniera, 260 m. 5.5.1980. Leg. B.
- 69 **Nuraghe Loelle** - Prov. Sassari, south of Budduso' along the road 389, ca. 750 m. 4.1987. Leg. M. Pertot.
- 70 **Nuraghe Losa** - Prov. Sassari. Nuraghe Losa near Abbasanta; ca. 280 m 1983. Leg. Feige.
- 71 **Nuraghe S. Antine** - Prov. Sassari. Valle dei Nuraghi. Nuraghe S. Antine 3.5 Km SSE of Torralba, NW of the train station of Torralba; another locality 1.5 Km SE of the train station. Basaltic rock, granite. ca. 350 m. 1.5.1986. Leg. E.
- 72 **Nuraghe Tradori** - Prov. Oristano. Road from Riola to S. Catterina.
- 73 **Orani** - Prov. Nuoro 521 m. (MAMELI 1920).
- 74 **Orri** - This locality is frequently cited by BAGLIETTO (1879, collections by Canepa). In Sardinia there are at least three localities with this name: one is "Lido di Orri'", in the Province of Nuoro, on the eastern coast, the remaining two are in the Province of Cagliari: one is "Villa Orri", a few Km southwest of Cagliari, on the coast, the other is M. Orri (723 m), south of Siliqua. Judging from the species collected in this locality, we think that M. Orri should

be excluded, since some of the species (e.g. *Tornabea scutellifera*) are restricted to the coast in Italy. In the herbarium Lojka (W) there is a duplicate of *Tornabea scutellifera* with the following label: "bei Orri im sudlichen Sardinien. Leg. Canepa"; this would exclude "Lido di Orri" which is not in southern Sardinia. A locality which in BAGLIETTO 1879 is often associated to Orri is "Flumini Bina" (often cited as "Flumini Bina supra Orri"); we could not find any such name on modern maps; it is most probably a site on the low hills behind Villa Orri.

- 75 **Padru Mannu** - Prov. Sassari. Altopiano di Campeda, west of Padru Mannu (10 Km north of Macomer), junction between Rio Berraghe and Rio Temo. 640-645 m. 29.3.1983. Leg. B.
- 76 **Palmadula** - Prov. Sassari, village of Palmadula close to Capo Argentiera, ca. 150 m. 4.1987. Leg. M. Pertot.
- 77 **Paulilattino** - Prov. Oristano. 280 m. (MAMELI 1920).
- 78 **Portixeddu** - Prov. Cagliari. West coast. ca. 2 Km south of Portixeddu, sand dunes, maquis vegetation, plantations of Eucalyptus and Pinus. 0-20 m. 2.5.1986. Leg. E.
- **Promontorio S. Elia** - see Capo S. Elia
- 79 **P.so La Variante** - Prov. Sassari. Passo La Variante, south of S. Teresa di Gallura on the road Nr 392, below M. Lu Colbu, granite, Quercus suber stands. 670-720 m. 5.5.1986. Leg. E.
- 80 **P.ta Falcone** - Prov. Sassari. Northwestern Coast. Punta (Capo) Falcone: from sea level to ca. 100 m at the northernmost end of the cape. Schists, scrub vegetation with Juniperus phoenicea. 23.7.1985. Leg. NP. - ibid. Leg. Feige, Pertot.
- 81 **P.ta Palai** - Prov. Nuoro. Catena del Marghine, Nuraghe Ortakis and forest of Badde Salighes just below the nuraghe, below P.ta Palai. Dry creek (basaltic rock); closed mixed wood with Ilex aquifolium. 850-920 m. 24.7.1985. Leg. NP. , same locality. Leg. B (7.5.1980)., WP and M. Pertot (4.1987).
- 82 **P.ta Paulinu** - Prov. Nuoro. Gennargentu Mts. P.ta Paulinu, east of Bruncu Spina, siliceous metamorphic rocks. 1800 m. 21.7.1985. Leg. NP.
- 83 **P.ta Serpeddi'** - Prov. Cagliari. Summit of M. Serpeddi', above Burcei, granite, ca. 1000 m, 19.7.1985. Leg. NP.
- 84 **P.to S.Stefano** - Prov. Cagliari, Porto Santo Stefano, close to Capo Carbonara, 2-4 m, granite outcrops along the coast, 17.7.1985. Leg. NP.
- **Rio Alino** - see M. Maxias.
- 85 **Rio Aratu** - Prov. Nuoro. Gennargentu Mts. Road Desulo-Fonni, narrow gorge along Rio Aratu, right of the road. Siliceous rocks, Ilex-Castanea stand. ca. 950 m. 22.7.1985. Leg. NP.
- 86 **Rio Pardu** - Prov. Nuoro. ca. 2 km west of Gairo. Rio Pardu, 460 m. 4.5.1986. Leg. E (J. Poelt & H. Wittmann).

- 87 **Road Arbus-Buggerru** - Prov. Cagliari. Arburese, road from Arbus to Buggerru, ca 1.5 Km NE of the road to Iglesias, hard metamorphic rocks, *Quercus ilex* stand. 90-110 m. 2.5.1986. Leg. E.
- 88 **Ruinas** - Prov. Oristano. 359 m. Leg. Marcucci (BAGLIETTO 1879).
- 89 **Santadi** - Prov. Cagliari. Outskirts of the village of Santadi 135 m. - village of Giba ("Gibba") 57 m. 5.1987. Leg. M. Tretiach.
- 90 **S'Arcu de Tascussi** - Prov. Nuoro. Gennargentu Mts., road Desulo-Fonni, below Bruncu Spina, ca. 1350 m. 21.7.1985. Leg. NP.
- 91 **Seui** - Prov. Nuoro. Barbagia Seulo, western part of the village of Seui, wayside trees, sandstone wall, ca. 800 m. 3.5.198. Leg. E. Collections by Marcucci, probably at higher elevation (BAGLIETTO 1879).
- 92 **S. Barbara** - Prov. Cagliari, close to the village of Capoterra. Collections of Canepa, probably in the surrounding mountains ("in sylvis montanis di S. Barbara" BAGLIETTO 1879).
- **Scaffa** - see Cagliari.
- **S. Bartolomeo** - see Cagliari.
- 93 **S. Lucia** - Prov. Cagliari. Valley of the Rio Giutturu Mannu on the road between Capoterra and Santadi, close to the church of S. Lucia. 60-90 m, hard metamorphic rocks. - 3 Km west of S. Lucia, road to Ciri Foddi. 18.7.1985. Leg. NP.
- 94 **S. Pantaleo** - Prov. Cagliari. Road Capoterra-Santadi, village of S. Pantaleo, ca, 250 m. 4.1987. Leg. Tretiach.
- 95 **SS. Trinita di Saccargia** - Prov. Sassari. Church of SS. Trinita' di Saccargia, close to Codrongiaus, ca. 30 m; fruit trees, basaltic rock. 18.5.1986. Leg. E.
- 96 **S. Teresa di Gallura** - Prov. Sassari, northeastern coast, granite along the coast close to the town center. 5-30 m 6.5.1986. Leg. E.
- 97 **Stintino** - Prov. Sassari. Peninsula of Stintino, between the southern part of Stagno di Casaraccio and Cala di Capotagliato, 3 and 4.2 Km S-SW of Stintino. Also west coast in Cala di Capotagliato. 0-45 m. 30.3.1983. and 30.4.1980. Leg. B.
- 98 **Tavolara** - Prov. Sassari, eastern coast; Isola di Tavolara; granite, limestone. 4. 1987. Leg. G. Brizzi.
- 99 **Tempio Pausania** - Prov. Sassari. Wayside trees in the town center. 560 m. 6.5.1986. Leg. E.
- 100 **Tharros** - Prov. Oristano, close to the necropolis in the direction of Capo S. Marco. 0-15 m. 1983. Leg. Feige.
- 101 **Tonara** - Prov. Nuoro. Gennargentu Mts., Castanea-woods 800-1000 m. Leg. Colosi (COLOSI 1917).
- **Torralba** - see Nuraghe S. Antine.
- 102 **Torre Argentina** - Prov. Nuoro. West Coast. Road Bosa-Alghero, coast north of Bosa, tuff; 0-20 m. 22.7.1985. Leg. NP.

- 103 **Tortoli** - Prov. Nuoro; eastern coast. 13 m. Tortoli (sometimes cited as Tortoly). Leg. Marcucci (BAGLIETTO 1879).
- **Tupa Granella** - see M. Maxias.
- 104 **Villacidro** - Prov. Cagliari. Northwestern part of the village of Villacidro, 270-370 m. 22.4.1979, Leg. WP.
- 105 **Villanova Strisaili** - Prov. Nuoro. 3 Km northwest of Villanova Strisaili, Km. 4 of the road to Arcu Correboi, ca. 860 m, granite. 7.5.1983. Leg. B.

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